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A systematic review and meta-analysis of the global prevalence and determinants of COVID-19 vaccine acceptance and uptake in people living with HIV

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SECTION A

Supplementary Table 1: Summary of the included studies

Author & publication year	Country	Study design	Sampling method	Study setting	Study period	Sample size [T; M (%)]	Age: mean (SD) or median [IQR]	Intention A (%); U (%)	Factors associated with vaccine acceptance, hesitancy, and uptake
Su et al[57]/2022	China	CS	SRS (PS)	Five cities (Chongzuo, Guigang, Laibin, Qinzhou, Yulin) in Guangxi	May 7 to June 1, 2021	903; 578 (64.0)	NA	A=658 (72.9); U=NA	Ethnicity (Zhuang versus Han), the higher level of education and believing that COVID-19 vaccination does not affect ART efficacy were associated with higher acceptance. The perception that COVID-19 vaccination is unsafe and less effective among PLHIV are associated with lower acceptance.
Buckley et al[58]/2022	US	CS	CoS (NPS)	Urban primary care clinic, New York City	March to May, 2021	223; NA	NA	A=167 (74.89); U=79 (35.43)	HIV control (undetectable VL less than 200), and age 35 to 65, and greater than 65 years old versus less than 35 years old were significantly associated with greater vaccine acceptance. Identifying as Black (vs White) is associated with lower odds of acceptance.
Zheng et al[59]/2021	China	CS	CoS (NPS)	Mainland China (Online)	February 2021	1295; 1295 (100)	29.3 [25.2–34.0]	A=NA; U=113 (8.7)	Lower COVID-19 hesitancy was associated with high ART adherence, paying attention to information about the COVID-19 vaccine (often, and sometimes), preference toward domestic vaccines, perceived moderate and moderately severe or severe impact of SARS-CoV-2 on immunity, waiting for vaccination programs

									organized at the workplace and unawareness of where to get COVID-19 vaccine. A higher degree of vaccine hesitancy was positively correlated with concern about the efficacy and side effects of the COVID-19 vaccine
Qi et al[60]/2021	China	CS	SbS (NPS)	Nationtion wide (Online)	May 1 to June 20, 2021	350; 335 (95.7)	36.01 (9.64)	A=280 (80); U=153 (43.7)	NA
Liu et al[33]/2021	China	CS	CoS (NPS)	Beijing Ditan Hospital, Capital Medical University	July 20 to August 20, 2021	378; 374 (98.9)	35 (8)	A=NA; U=219 (57.5)	NA
Wu et al[61]/2022	China	CS	CoS (NPS)	Wuchang district CDC (Online)	April 4 to April 18, 2021	556; 515 (92.6)	37.59 (11.45)	A=338 (60.8); U=NA	PLHIV with comorbid illnesses, those who believe that their HIV would be worse if they were infected with SARS-CoV-2, and those who believe that their ART would be affected by COVID-19 pandemic were more willing to accept COVID-19 vaccination. Higher monthly income, and being heterosexual (vs. homosexual) were associated with lower willingness to accept COVID-19 vaccination.
Vallée et al[62]/2021	France	CS	NPS	Foch Hospital, Suresnes; (Online)	January, 2021	237; 181 (76.7)	53 (NA)	A=169 (71.3); U=NA	Participant's concerns about their health, the requirement of mandatory COVID-19 vaccination, and presence of chronic disease(s) were independently associated with a higher likelihood of vaccine acceptance. Conversely,

									participants with concerns about the serious side effects of COVID-19 vaccines, and those who believe that they are already naturally protected against COVID-19 infection were more likely to be COVID-19 vaccine-hesitant.
Menza et al[63] /2022	US	NR	NPS	Oregon	May 10, 2021	8022; 7095 (88.4)	NA	A=NA; U=4943 (61.6)	Older age, CD4 count or viral load measurement in 2020, participation in AIDS Drug Assistance Program (ADAP), and receiving Flu vaccination were associated with increased uptake. Being Hispanic/Latinx, male homosexual, injection drug user, and rural resident are associated with lower uptake.
Ekstrand et al[64]/2021	India	NR	NPS	Kamtaka state; Telephone interview	January 18 and February 19, 2021	438; (212 61.6)	39.5 (8.8)	A=270 (61.6)	Fear of vaccine side effects, having little/no confidence that vaccine is safe, having little/no confidence that vaccine protects against COVID-19, number of sources on vaccine information, and not knowing about anyone who died of COVID-19 are associated with increased odds of hesitancy.
Fulda et al[65]/2022	Multicontinent (Brazil, Botswana, Canada, Haiti, India, Peru, South Africa, Spain, Thailand, Uganda, the United	NR (secondary data analysis)	PS	Brazil (n = 1042), Botswana (n = 273), Canada (n = 123), Haiti (n = 136), India (n = 469), Peru (n = 142),	January 2021 to July 2021	6952	NR	U (Global)= 4519 (65); [United States (72), Peru (69), and Brazil (63), South Africa	Participants who received the COVID-19 vaccine were more likely to come from high-income countries; be white, male, or older; and have a high body mass index, higher atherosclerotic cardiovascular disease (ASCVD) risk score, and longer duration of ART.

	States, and Zimbabwe)			South Africa (n = 527), Spain (n = 198), Thailand (n = 582), Uganda (n = 175), the United States (n = 3162), and Zimbabwe (n = 123)				(18), Uganda (3), and Haiti (0); others=NA]	
Shrestha et al[66] /2022	US	CS	CoS (NPS)	Nationwide (Online)	December 6 2020 to January 8 2021	1030; 924 (89.7)	53.0 [60.0−41.0]	NA	Being Black, single, politically conservative, concerned about side-effects, concerned about safety, and worried that the vaccine will not be effective are associated with a higher likelihood of hesitancy. Participants with liberal political orientation and those who were male, White, and university graduates and had a CD4 count of over 200 cells/mm3 had a lower likelihood of hesitancy.
Al-Yammahi et al[67]/2021	Ireland	RCR	NA	Beaumont Hospital **(**Onsite**)**	April 2021	40; 20 (53)	NA	A=28 (70.0); U=NA	NA
Yang et al[68]/2022	China	CS	CoS (NPS)	North (Tianjin, Beijing),	January and	2740; 2588 (94.5)	838 (30.6) are 18-	A=NA; U=170 (6.2)	Being among those prioritized to receive vaccination, receiving advice from staff supporting COVID-19 vaccination, being

				Northeast (Shenyang, Hohhot), East (Nanjing), (Nanning, Guangzhou, Shenzhen). Online	February 2021		29 years		exposed to groups supporting COVID-19 vaccination among PLHIV on the internet/social media, being cohabited/married with an opposite-sex partner, and having positive attitudes toward COVID-19 vaccination, were associated with a higher likelihood of vaccine uptake. Having negative attitudes toward COVID-19 vaccination and lacking a full-time job were negatively associated with vaccine uptake.
Mesfin et al[69]/2021	Ethiopia	CS	SyS (PS)	Butajira General Hospital (Onsite)	March 1 to April 28, 2021	398; 236 (59)	32.15 (5.1)	A=134 (33.7); U=NA	Having a chronic illness, being male, and having good knowledge about COVID-19 practice were associated with higher odds of acceptance.
Kaida et al[32]/2022	Canada	CS	NR (PS)	British Columbia (Online)	August 20-March 1, 2021	69; 3 (4.3)	49.9 (11.4)	A=45 (65.2); U=NA	Factors associated with intention to receive the COVID-19 vaccine included being older, reporting one or more chronic health condition, and being strongly influenced by direct and indirect social norms that encourage vaccination. Lack of confidence in the COVID-19 vaccine was associated with a lower likelihood of intention to vaccinate.
Iliyasu et al[70] /2022	Nigeria	CS	SyS (PS)	Aminu Kano Teaching Hospital (Onsite)	March 2021	344; 153 (44.5)	39.2 (9.68)	A=159 (46.2); U=NA	Being non-Muslim, having high-risk perception, not being worried about vaccine-related infertility rumors and believing that antiretroviral drugs protect against COVID-19 were associated with a higher likelihood of acceptance. Not being concerned about the potential effects of COVID-19-HIV co-infection was associated with a decreased likelihood of acceptance.

Chai et al[71] /2022	China	CS	ClS (PS)	Five metropolitan cities (Online)	January 2021 and February 2021	1735; 1638 (94.41)	NA	A=1013 (58.3); U=NA	NA
Jaiswal et al[72] /2022	US	CS	SRS (PS)	US/US territories (Online)	March and May 2021	496; 226 (45.6)	50.08 (0.61)	A=429 (86.5); U= 319 (64.3)	Having at least a bachelor's degree is associated with a higher likelihood of uptake. While higher levels of COVID-19 vaccine hesitancy scores are associated with a lower likelihood of willingness to accept the vaccine.
Jones et al[73] /2021	US	CS	CoS (NPS)	Miami	August to November 2020.	94; 23 (60.5)	54.4 (11.3)	A=51 (54.3); U=NA	Participants who agreed or strongly agreed that vaccines are important for health, those who agreed or strongly agreed that vaccines are effective, those who agreed or strongly agreed that vaccine-related information is trustworthy and reliable, those who agreed or strongly agreed with following doctors' recommendations regarding vaccines, and those who agreed or strongly agreed that getting vaccinated protects them from the disease had higher odds of willingness to accept the vaccine.
Zhao et al[74] /2021	China	CS	CoS (NPS)	Nationwide (Online)	7 and 23 February 2021	1618; 1541 (95.2)	NA	A=NA; U= 527 (32.6)	PLHIV with a higher level of education, those who received pneumonia or influenza vaccine in the past 3 years, those engaged in occupations with a high COVID-19 infection risk, those who believed in COVID-19 vaccine's effectiveness, and those who received COVID-19 vaccine information from the media were more likely to be vaccinated. Being concerned with adverse reactions, disclosure of participant's HIV status, and vaccine's adverse effect on HIV progression,

									as well as the presence of comorbidities, being unmarried and older age were associated with a lower likelihood of being vaccinated
Huang et al[75] /2021	China	CS	CoS (NPS)	Nationwide (Online)	January and February 2021	2570; 2431 (94.6)	NR	A=1470 (57.2); U=NA	Factors associated with a higher likelihood of acceptance included, positive attitude to COVID-19 vaccine, perceived support from valued contacts, source of information on COVID-19 vaccination (including doctors, staff of organizations offering services to PLHIV, family members and friends, and PLHIV peers). A lower likelihood of acceptance was associated with negative attitudes toward COVID-19 vaccination.
Govere-Hwenje et al[76]/2022	South Africa	CS	SRS (PS)	KwaZulu-Natal province	September 2020 and January 2021	213; 60 (28)	35 [29-43]	A=121 (57); U=NA	Older age was associated with the likelihood of acceptance. On the other hand, higher COVID-19-related mistrust and having social media as the source of information about COVID-19 were associated with a lower likelihood of acceptance.
Ortiz-Mart´ınez et al[77]/2022	Latin America	CS	CoS (NPS)	Online	February to May 2021	528; 506 (95.83)	30 (27-36)	A=460 (87.12); U=NA	NA.
Davtyan et al[78]/2022	US	CS	NPS	Coachella Valley, California (online)	September 2020 and February 2021	114; 81 (95)	62.22 (7.20)	A=86 (75); U=NA	Female and unemployed PLHIV had a lower likelihood of acceptance.
Mohamed et al[79] /2022	Egypt, Tunisia and Saudi Arabia	CS	PQS (NPS)	Egypt 227 (42%), Saudi Arabia 184	March 2021 and August 2021	540; 389 (72)	NA	A= 349 (64.6); U= 104 (19.3)	Factors associated with a higher likelihood of acceptance included being less worried to contract COVID-19 after vaccination, the belief the vaccination prevents COVID-19, and doctor’s

				(34.4%), Tunisia 127 (23.5%). Online					advice to vaccinate. While residing in rural settings, the belief that ART prevents COVID-19, skepticism about the vaccine effectiveness, and having a CD4 count assessed within the previous year were associated with a lower likelihood of acceptance.
Kabir et al[80] /2022	Nigeria	CS	CoS (NPS)	Six ART clinics (2 from Kano state, and four from Yobe state)	October 11 2021 February 24 2022	763; 171 (38.18)	39.76 (10.75)	A=382 (50.1); U=103 (13.5)	Older age, male sex, unemployed, attending ART a town-located ART clinic, perceived high COVID-19 susceptibility and having a history of adverse effects of ART drug were associated with a lower likelihood of hesitancy. Conversely, compared to those attending General Hospital Gashua, participants attending the ART clinic at Infectious Disease Hospital Kano. Murtala Muhammad Specialist Hospital Kano, and Yobe State Specialist Hospital Damaturu, all located in metropolitan cities, had significantly higher odds of hesitancy.
Donohue et al[81]/2021	Ireland	CS	NA	Galway hospital (Onsite)	December 10 2020 to April 1 2021	51; 35 (68.6)	NA	A=48 (94.1); U=NA	NA
Holt et al[82]/2022	Australia	CS	NPS	Nationwide (Online)	April–June 2021	95; NA	NA	A=77 (81.1); U=42 (44.2)	NA
Muhindo et al[83]/2022	Uganda	CS	NPS	Six ART clinics (Komamb	January to April 2022	767; 282 (37)	Women:33 [28–	A=703 (91.7);	Attainment of secondary education, older age being, belief in the benefit of vaccination, belief in the safety of COVID-19 vaccines for PLHIV

				oga, Kisenyi, Kiswa, Kitebi, Kawaala, and Kasangati) in Kampala (Onsite)			40]; men: 40 [34–47]	U=534 (70.80)	and their ease of accessibility were associated with a higher likelihood of acceptance. Also, the perceived benefit of the vaccination for PLHIV, belief in the safety of the vaccine in PLHIV, ease of access, being unemployed, being female, and being tested before for COVID-19 are associated with a higher likelihood of uptake.
Swendeman et al[84]/2022	US	CS	NPS	Los Angeles and New Orleans (Online)	October 2020	52; NA	NA	A=32 (61.5); U=NA	
Wickersham et al[85]/2022	US	CS	NPS	Nationwide (Online)	December 6 2020 to January 8 2021	1030; 924 (89.7)	50.7 (12.5)	A=858 (83.8); U=NA	Being black, politically conservative, low income were associated with a lower likelihood of acceptance. On the other hand, being vaccinated annually against influenza, and being politically liberal were associated with a higher willingness to accept the vaccine.
Prestage et al[86]/2022	Australia	CS	CoS (NPS)	Nationwide (Online)	January 17 2021 to June 22 2021	57; NA	NA	A=NA; U=35 (61.4);	NA
Siewe Fodjo et al[87]/2021	Multicontinent	CS	NPS	Multinational (Online)	July 20-November 30 2020	247; NA	44.5 (13.2)	A=188 (76.1); U=NA	NA

Folayan et al[88]/2022	Nigeria	CS	SbS (NPS)	Adamawa, Akwa Ibom, Anambra, Benue, Kaduna, Lagos, Enugu, Gombe, Nassarawa and Niger (Online/Onsite)	June to October 2021	2024; NA	NA	A=1621 (80.1); U=NA	NA
Bogart et al[89]/2022	US	CS	CoS (NPS)	Los Angeles County, California (Onsite)	May to July, 2020	101; 88 (87)	50.3 (11.5)	A=69 (78.0); U=NA	NA
Lyons et al[90]/2023	Trinidad & Tobago	CS	CoS (NPS)	Medical Research Foundation of Trinidad and Tobago (MRFTT) (Onsite)	August and September 2021	272; 135 (49.6)	41 (13.0)	A=163 (59.9); U=NA	Bein females, and having a mixed ethnicity were associated with lower acceptance. On the other hand, Indo-Trinidadians, non-heterosexuals, and being confident in the COVID-19 vaccine were associated with higher acceptance.
Madzima et al[91]/2022	Zimbabwe	CS	StS (PS)	Nationwide (Onsite)	October 2020 to	480; 142 (32.49)	NA	A=NA; U=280 (64.07)	NA

					November 2021.				
Chaudhuri et al[92]/2022	India	CS	SnS (NPS)	Chittoor district of Andhra Pradesh (Online/on site)	September to October 2021	247; 106 (42.9)	40 (11)	A=218 (88.26); U=195 (78.95)	NA
Bert et al[93]/2022	Italy	CS	NPS	Amedeo di Savoia Hospital in Turin (Onsite)	November 2021 to April 2022	160; 133 (83.1)	49.97 (11.82)	A=149 (93.13); U=137 (86.2)	NA
Shallangwa et al[94]/2023	Nigeria	CS	NPS	State Specialist Hospital Maiduguri (Onsite)	January 4 to February 25 2022	344; 102 (29.7)	NA	A=115 (33.4); U=88 (26.6)	No significant relationship
Mchawa et al[95]/2023	Malawi	CS	CoS (NPS)	Mpemba health center in Traditional Authority Somba, in Blantyre district (Onsite)	May to September 2022	341; 142 (41.6	NA	A=150 (43.99); U=NA	Having higher levels of knowledge, good attitude and trust in the COVID-19 vaccination were negatively associated with hesitancy.

Sun et al[96]/2022	China	CS	NPS	PLA General Hospital (Onsite)	June to December 2021	169; NA	NA	A=102 (60.36); U=NA	Age of the participants vaccine safety were associated with intention to vaccinate against COVID-19.
Singh et al[97]/2023	India	CS	CsS (NPS)	Northe India (Onsite)	May and June 2021	300; 180 (59.33)	40	A=60 (20.0); U=NA	NA
Lv et al[98]/2023	China	CS	NPS	Mainland China (Online)	January 2022 to March 2022	1424; 1295 (90.9)	NA	A=1316 (92.42); U=1258 (88.34)	Being older, having lower academic level, having comorbidity, having lower CD4+ count, having higher levels of anxiety and despair, and high risk perception were associated with higher levels of COVID-19 vaccine hesitancy. Also, lower vaccine uptake were associated with having lower level of education, lower CD4 count, and having higher levels of anxiety and depression.
Ogaz et al[99]/2023	UK	CS	NPS	Nationwide (Online)	November to December 2021	120; NA	NA	A=NA;U=114 (95.0)	NA
Rosenthal et al[100]/2023	US	RC	NR	New York (Oline RCR)	Through March 2022	101,205; 70,636 (69.8%)	NA	A=NA; U=72950 (72.08)	NA
Hechter et al[101]/2023	US	RC	NR	California, Colorado, Washingto, Denver (Online RCR)	December 1 to December 31 2021	22,063; NA	NA	A=NA; U= 19,966 (90.5)	Being male, being Asian, and being vaccinated against influenza in the previous two years were associated with higher COVID-19 vaccination. While PLHIV having a CD4 count <200, and those who have failed to achieve viral suppression had lower vaccination.

Baker et al[102]/2023	US	PC	NR	Maryland (Online RCR)	April 6 2021 to February 22 2022	960; NA	NA	A=NA; U=670 (70.0)	Being male, belonging to Black race, and HIV viral suppression (<400) were associated with higher COVID-19 vaccination completion. While being over 50 years was associated with lower completion.
Wicaksana et al[103]/2023	Indonesia	CS	SRS (PS)	Jakarta (Cipto Mangunkusumo Hospital, Dharmais National Cancer Hospital, and Kramat 128 Hospital) (Online and Onsite)	September to December 2021	470; 358 (76.2)	NA	A=355; U=NA	Determinants of intention to vaccinate include instrumental attitude, perceived behavioral control, and subjective norm.
Strathdee et al[104]/2023	US	Cohort	NPS	San Diego, California (Onsite)	October 2020 to September 2021 and through March 15, 2022	15; NA	NA	A=NA; U=8	NA

Javanbakht et al[105]/2023	US	Cohort	CoS (NPS)	Baltimore, Chicago, Los Angeles, Miami, and Vancouver (Online)	May 2021 to January 2022	777; NA	NA	A=683; U=677	NA
Costiniuk et al[106]/2023	Canada	CS	NPS	Nationwide (Online)	February to May 2022	246; 189 (76.8)	46.8 (14.0)	A=NA; U=219 (84.6)	Age per ten-year increase and higher level of education were associated with vaccination.
Cummings et al[107]/2023	Sierra Leone	CS	CoS (NPS)	Connaught Hospital in Freetown (Onsite)	April to June 2022	490; 140 (28.6)	38 (32-49)	A=NA; U=85	PLHIV who are Muslim and those residing in urban areas had higher COVID-19 vaccine hesitancy. While a past history of COVID-19 testing was associated with lower hesitancy.
Tunta et al[108]/2023	Ethiopia	CS	CsS (NPS)	Woldia comprehensive specialized hospital located, Northern Ethiopia. (Onsite)	February 15 to March 15, 2022	332; 128 (38.55)	NA	A=220 (66.3); U=NA	Having poor knowledge and negative attitude toward COVID-19 was significantly associated with vaccine refusal. And rural residence was associated with lower likelihood of willingness to vaccinate against the COVID-19.

Keys: ART, Antiretroviral therapy; CC, Case-Control; ClS, Clustered sampling; CoS, Convenient sampling; CsS, Consecutive Sampling; NA, Not available; NPS, Non-probability sampling; NS, Not Reported; PC, Prospective Cohort; PS, Probability sampling; PQS, Purposive quota sampling; RC, Retrospective Cohort; RCR, Retrospective charts review; SnS, Snowball sampling; SRS, Simple random sampling; StS, Stratified sampling; SyS, Systematic sampling.

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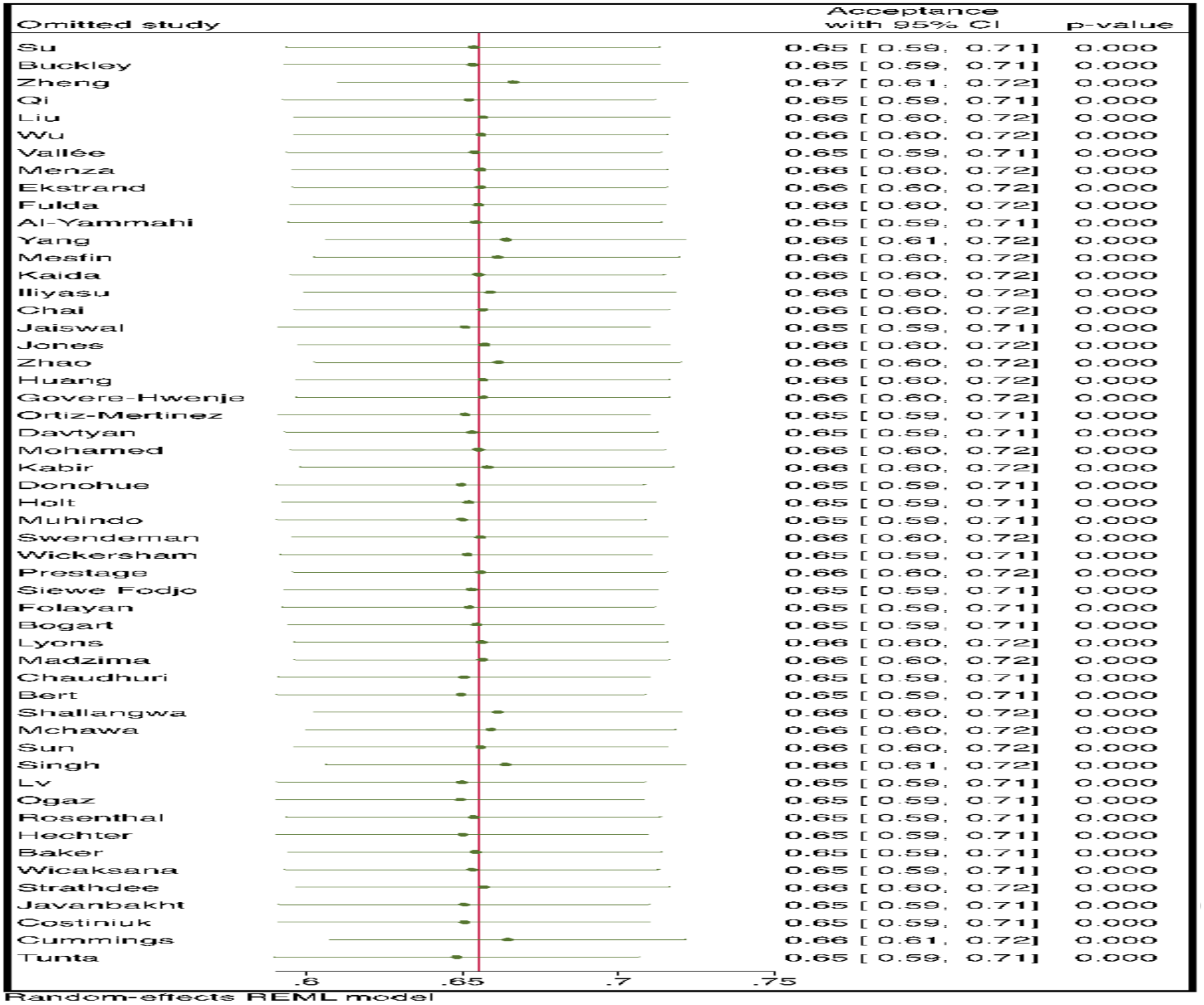
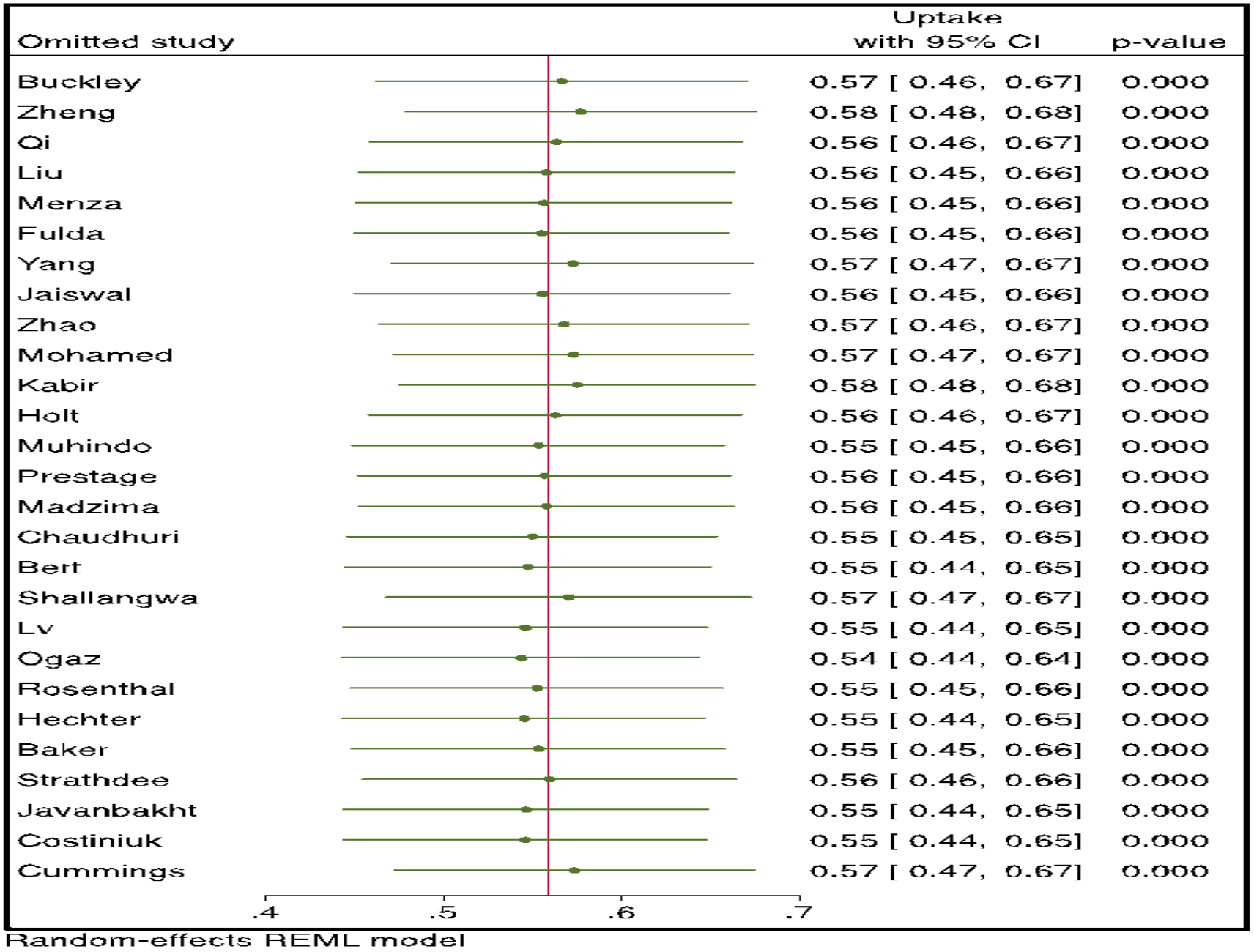
SECTION B

Results of meta-analysis of COVID-19 vaccine acceptance and uptake using all studies



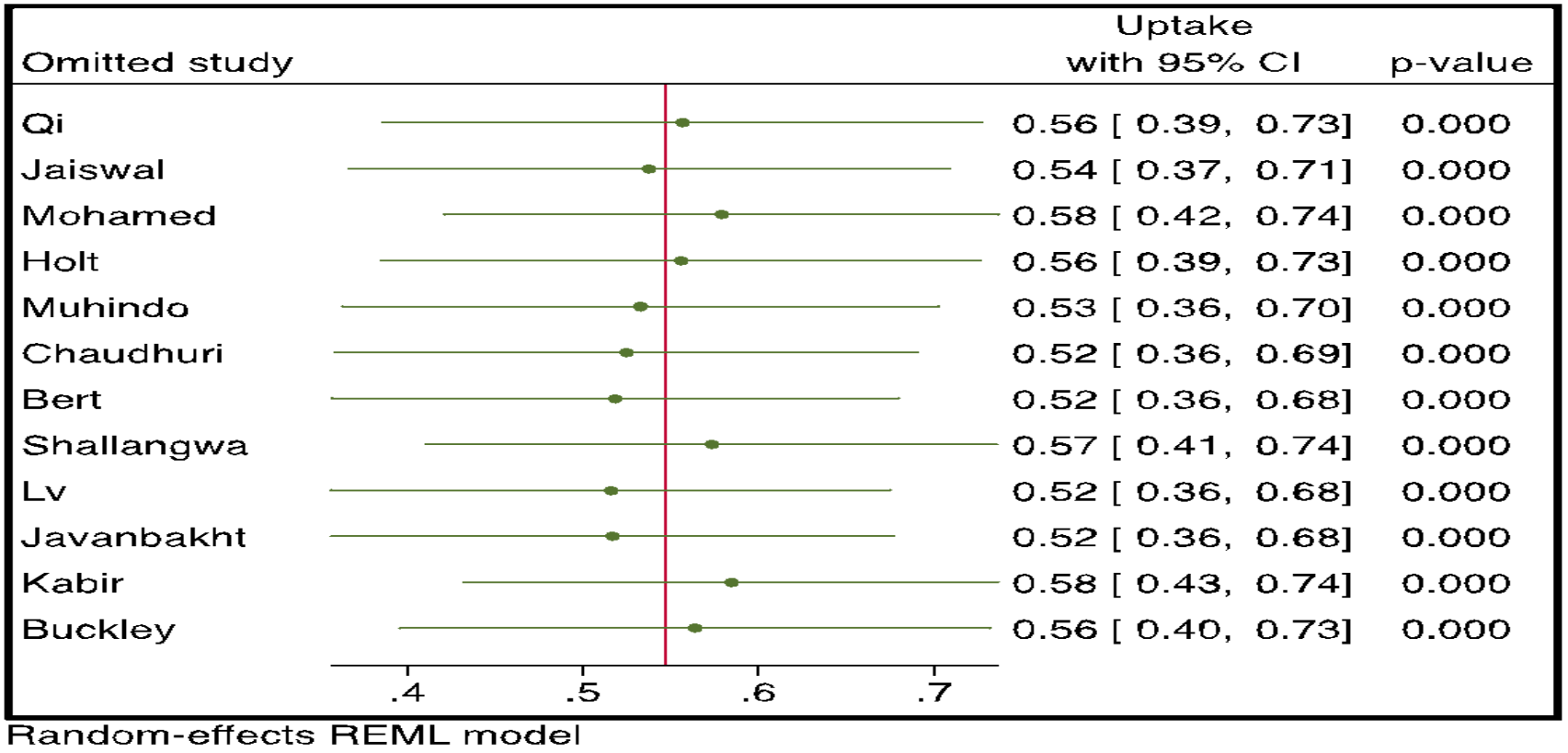
Random-effects REML model

Supplementary Figure. 1: Forest plot of sensitivity analyses for each study reporting the acceptance rate of the COVID-19 vaccine among PLHIV using random effects model meta-analysis. Each solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. (n = 53 studies, N = 166,455 participants).



Random-effects REML model

Supplementary Figure 2: Forest plot of sensitivity analyses for each study reporting the uptake rate of the COVID-19 vaccine among PLHIV using random effects model meta-analysis. Each solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals (n = 27 studies, N = 150,926 participants).



Supplementary Figure 3: Forest plot of sensitivity analyses for each study reporting the uptake rate of the COVID-19 vaccine among PLHIV who indicated acceptance using random effects model meta-analysis. Each solid square represents the effect

size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals (n = 13 studies, N = 6,564 participants).

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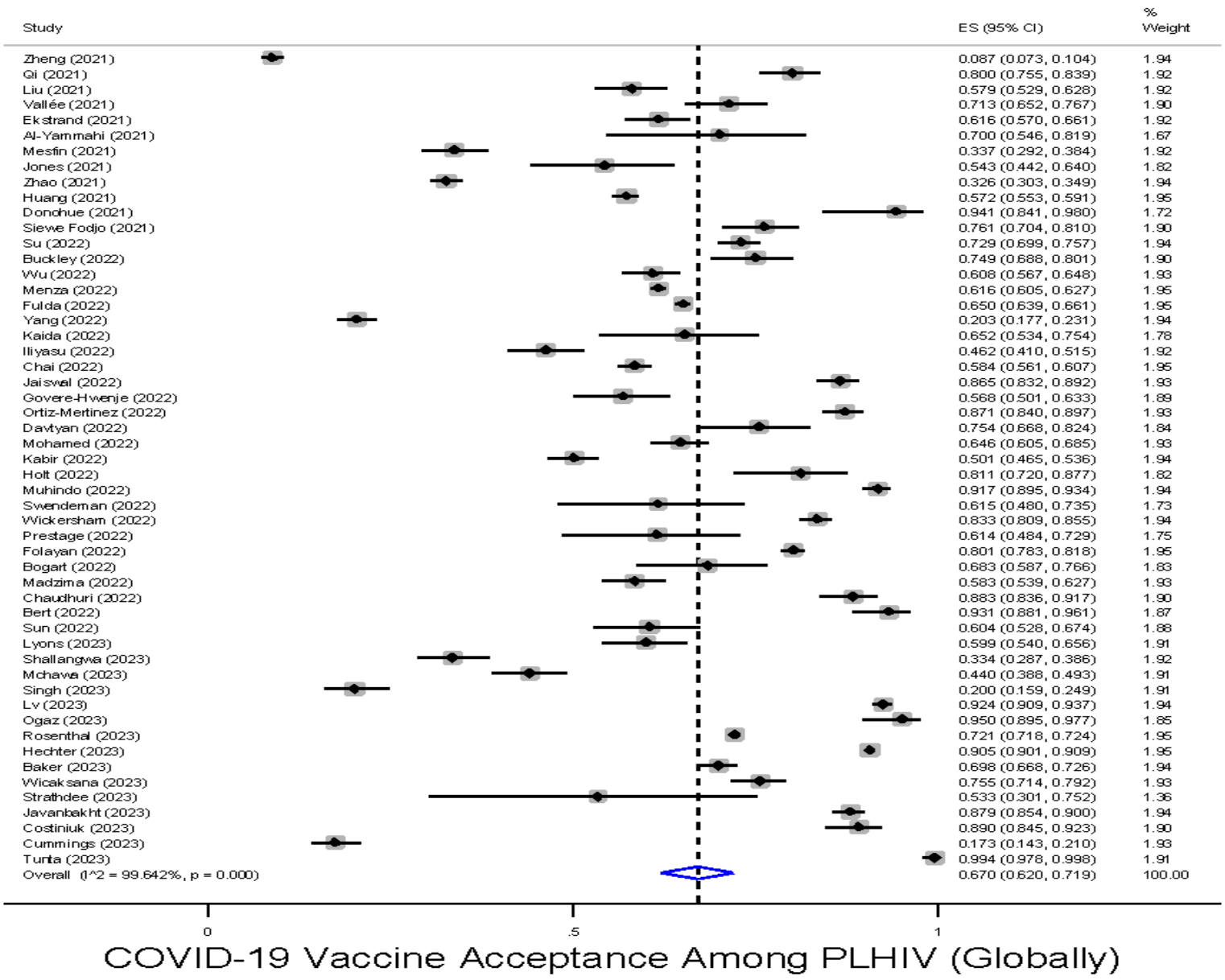
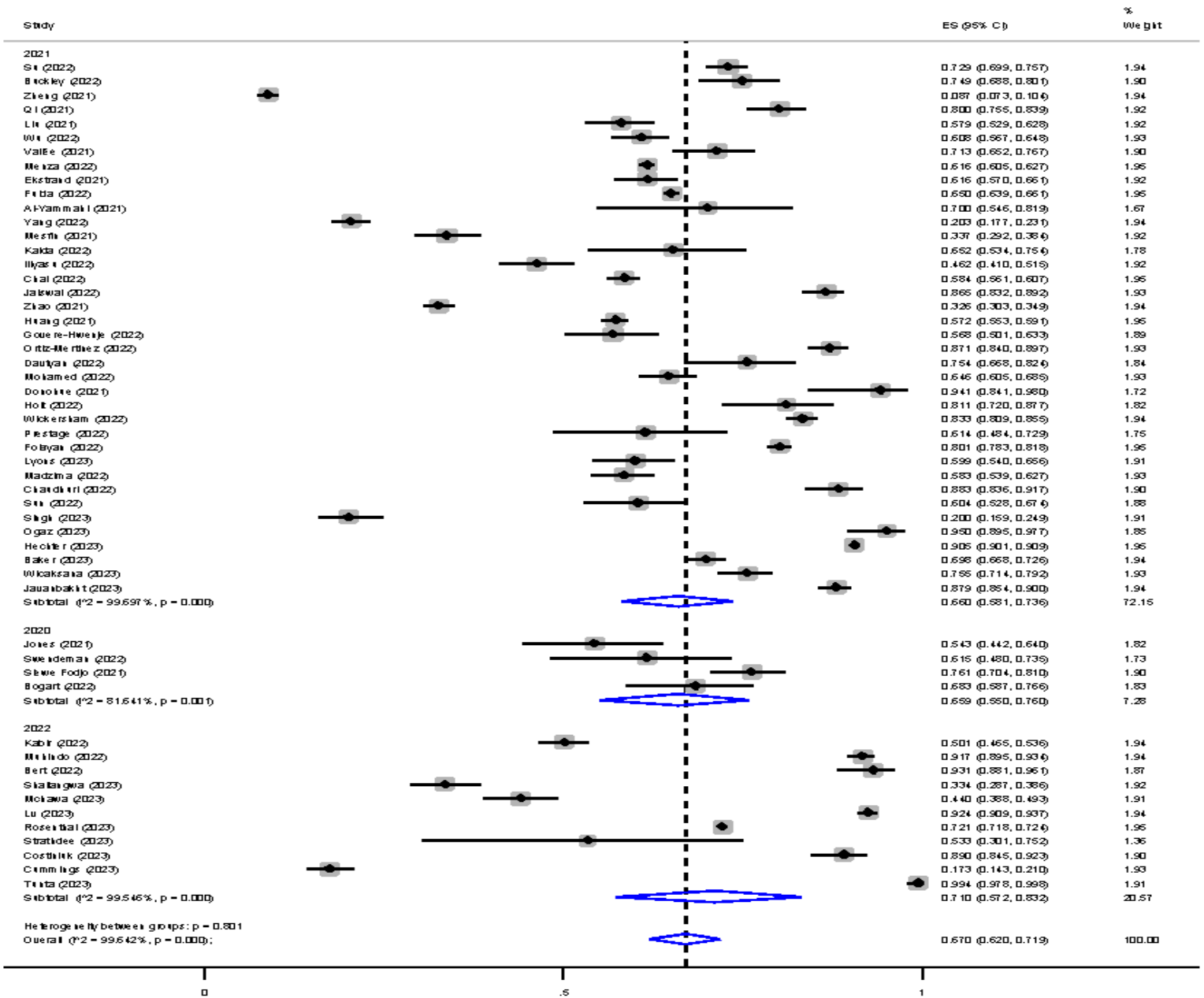
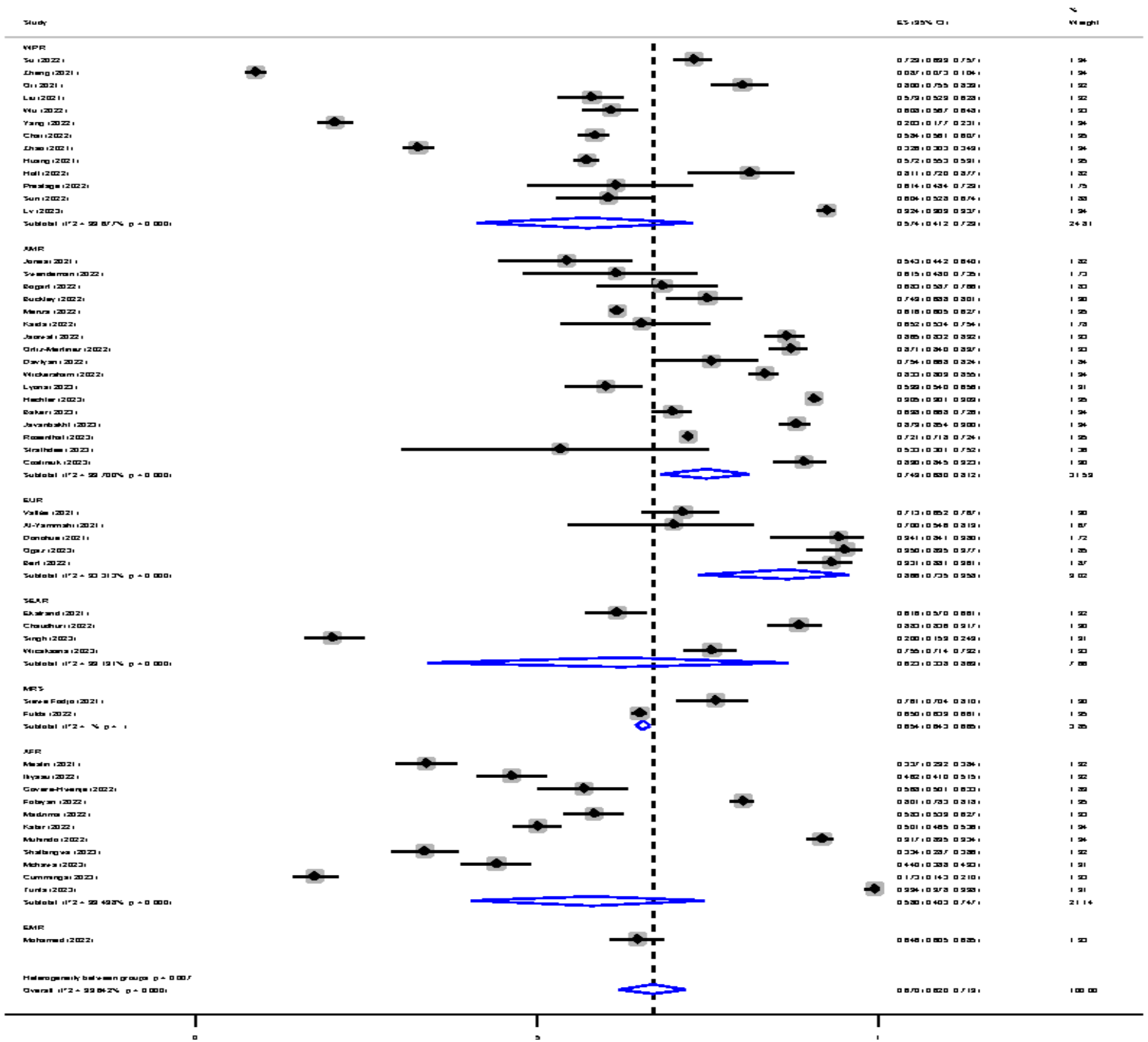

Study
ES (95% CI)
% Weight
Zheng (2021) 0.087 (0.073, 0.104) 1.94
Qi (2021) 0.800 (0.755, 0.839) 1.92
Liu (2021) 0.579 (0.529, 0.628) 1.92
Vallée (2021) 0.713 (0.652, 0.767) 1.90
Ekstrand (2021) 0.616 (0.570, 0.661) 1.92
Al-Yammahi (2021) 0.700 (0.546, 0.819) 1.67
Mesfin (2021) 0.337 (0.292, 0.384) 1.92
Jones (2021) 0.543 (0.442, 0.640) 1.82
Zhao (2021) 0.326 (0.303, 0.349) 1.94
Huang (2021) 0.572 (0.553, 0.591) 1.95
Donohue (2021) 0.941 (0.841, 0.980) 1.72
Siewe Fodjo (2021) 0.761 (0.704, 0.810) 1.90
Su (2022) 0.729 (0.699, 0.757) 1.94
Buckley (2022) 0.749 (0.688, 0.801) 1.90
Wu (2022) 0.608 (0.567, 0.648) 1.93
Menza (2022) 0.616 (0.605, 0.627) 1.95
Fulda (2022) 0.650 (0.639, 0.661) 1.95
Yang (2022) 0.203 (0.177, 0.231) 1.94
Kaida (2022) 0.652 (0.534, 0.754) 1.78
Iliyasu (2022) 0.462 (0.410, 0.515) 1.92
Chai (2022) 0.584 (0.561, 0.607) 1.95
Jaiswal (2022) 0.865 (0.832, 0.892) 1.93
Govere-Hwenje (2022) 0.568 (0.501, 0.633) 1.89
Ortiz-Martinez (2022) 0.871 (0.840, 0.897) 1.93
Davtyan (2022) 0.754 (0.668, 0.824) 1.84
Mohamed (2022) 0.646 (0.605, 0.685) 1.93
Kabir (2022) 0.501 (0.465, 0.536) 1.94
Holt (2022) 0.811 (0.720, 0.877) 1.82
Muhindo (2022) 0.917 (0.895, 0.934) 1.94
Swendeman (2022) 0.615 (0.480, 0.735) 1.73
Wickersham (2022) 0.833 (0.809, 0.855) 1.94
Prestage (2022) 0.614 (0.484, 0.729) 1.75
Folayan (2022) 0.801 (0.783, 0.818) 1.95
Bogart (2022) 0.683 (0.587, 0.766) 1.83
Madzima (2022) 0.583 (0.539, 0.627) 1.93
Chaudhuri (2022) 0.883 (0.836, 0.917) 1.90
Bert (2022) 0.931 (0.881, 0.961) 1.87
Sun (2022) 0.604 (0.528, 0.674) 1.88
Lyons (2023) 0.599 (0.540, 0.656) 1.91
Shallangwa (2023) 0.334 (0.287, 0.386) 1.92
Mchawa (2023) 0.440 (0.388, 0.493) 1.91
Singh (2023) 0.200 (0.159, 0.249) 1.91
Lv (2023) 0.924 (0.909, 0.937) 1.94
Ogaz (2023) 0.950 (0.895, 0.977) 1.85
Rosenthal (2023) 0.721 (0.718, 0.724) 1.95
Hechter (2023) 0.905 (0.901, 0.909) 1.95
Baker (2023) 0.698 (0.668, 0.726) 1.94
Wicaksana (2023) 0.755 (0.714, 0.792) 1.93
Strathdee (2023) 0.533 (0.301, 0.752) 1.36
Javanbakht (2023) 0.879 (0.854, 0.900) 1.94
Costiniuk (2023) 0.890 (0.845, 0.923) 1.90
Cummings (2023) 0.173 (0.143, 0.210) 1.93
Tunta (2023) 0.994 (0.978, 0.998) 1.91
Overall (I^2 = 99.642%, p = 0.000) 0.670 (0.620, 0.719) 100.00
0
.5
1
COVID-19 Vaccine Acceptance Among PLHIV (Globally)

Supplementary Figure 4: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance globally (n = 53 studies, N = 166,455 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

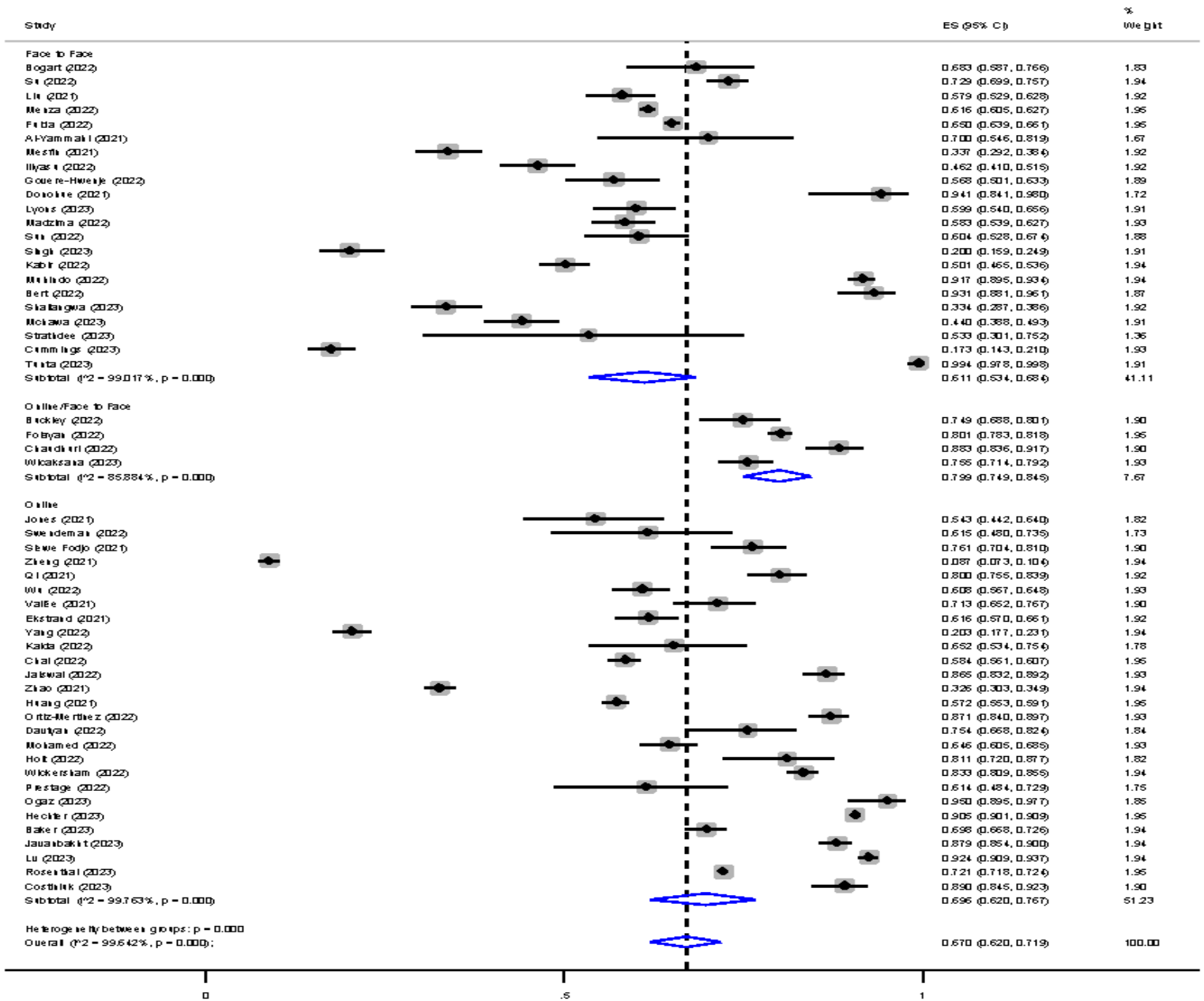


COVID-19 Vaccine Acceptance Among PLHIV (By Study Year)

Supplementary Figure 5: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the study (n = 53 studies, N = 166,455 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

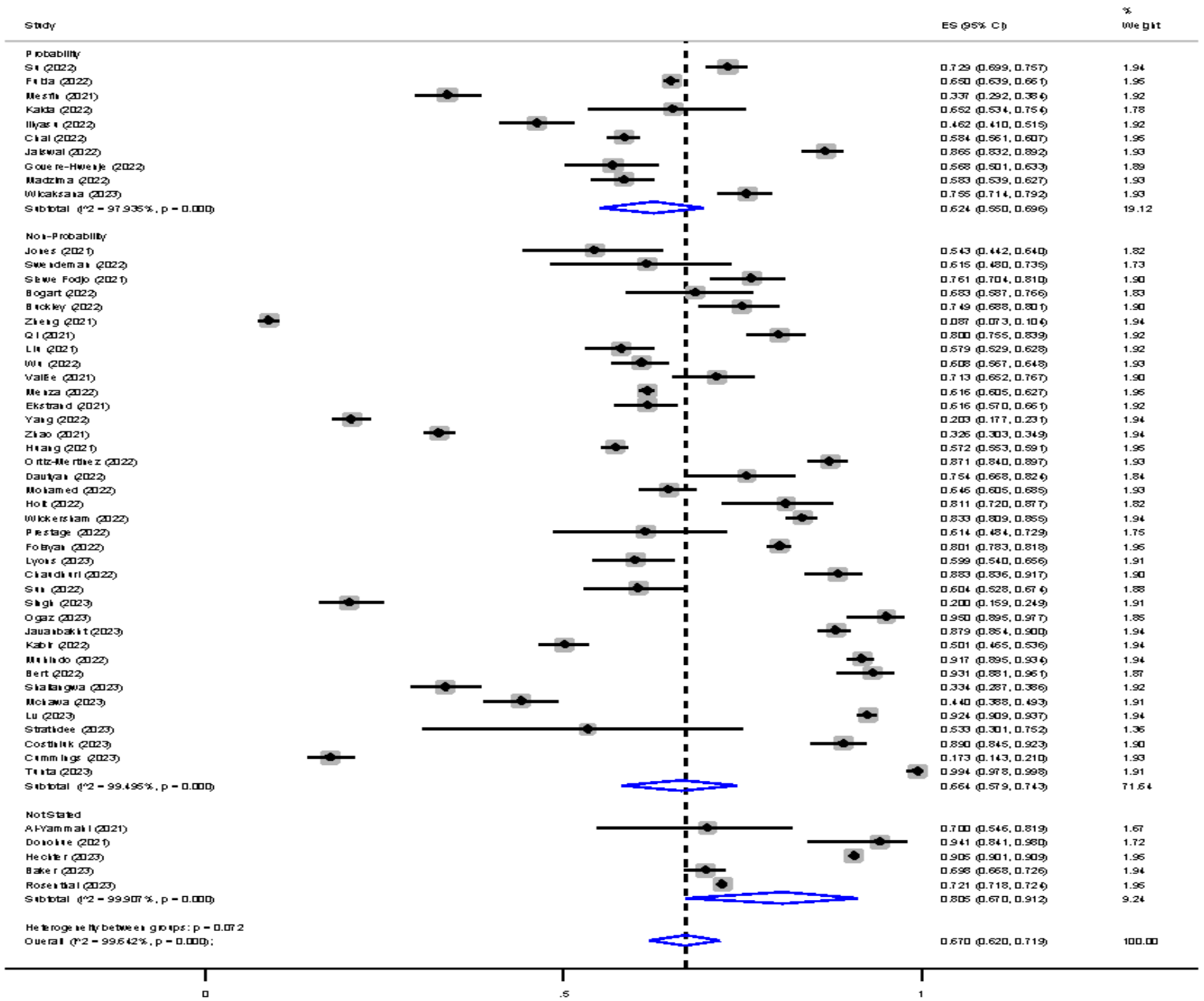

Study
ES (95% CI)
% Weight
WPR
Su (2022)
Zhang (2021)
Qi (2021)
Lei (2021)
Wu (2022)
Yang (2022)
Chen (2022)
Zhao (2021)
Huang (2021)
Hall (2022)
Prestage (2022)
Sun (2022)
Lv (2023)
Subtotal (I^2 = 99.87.7% p = 0.000)
0.76 (0.61 2 0.72)
24.31
AMR
Jones (2021)
Swenderman (2022)
Regan (2022)
Buckley (2022)
Manna (2022)
Kaida (2022)
Jaoreal (2022)
Ortiz-Martinez (2022)
Davtyan (2022)
Wickersham (2022)
Lyons (2023)
Hechler (2023)
Baker (2023)
Javanbakht (2023)
Rosenthal (2023)
Strathdee (2023)
Coelmuk (2023)
Subtotal (I^2 = 99.700% p = 0.000)
0.74 (0.63 0.81 2)
31.59
EUR
Vallée (2021)
Al-Yammahi (2021)
Donahue (2021)
Ogaz (2023)
Berl (2022)
Subtotal (I^2 = 90.31.3% p = 0.000)
0.88 (0.73 5 0.95 8)
9.02
SEAR
Ekstrand (2021)
Choudhuri (2022)
Singh (2023)
Nicolazzo (2023)
Subtotal (I^2 = 99.19.1% p = 0.000)
0.82 (0.33 8 0.98 9)
7.88
MRS
Sierra Fadjo (2021)
Fuldo (2022)
Subtotal (I^2 = .% p = .)
0.85 (0.84 3 0.88 5)
3.35
AFR
Medin (2021)
Ilyasu (2022)
Govere-Hwenje (2022)
Fabyan (2022)
Madanna (2022)
Kabir (2022)
Muhindo (2022)
Shalangwa (2023)
Mohara (2023)
Cummings (2023)
Funk (2023)
Subtotal (I^2 = 99.49.8% p = 0.000)
0.58 (0.40 3 0.74 7)
21.14
EMR
Mohamed (2022)
0.84 (0.80 5 0.88 5)
1.90
Heterogeneity between groups p = 0.007
Overall (I^2 = 99.84.2% p = 0.000)
0.87 (0.82 0 0.91 9)
100.00
0
5
1

Supplementary Figure 6: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the WHO region (n = 53 studies, N = 166,455 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



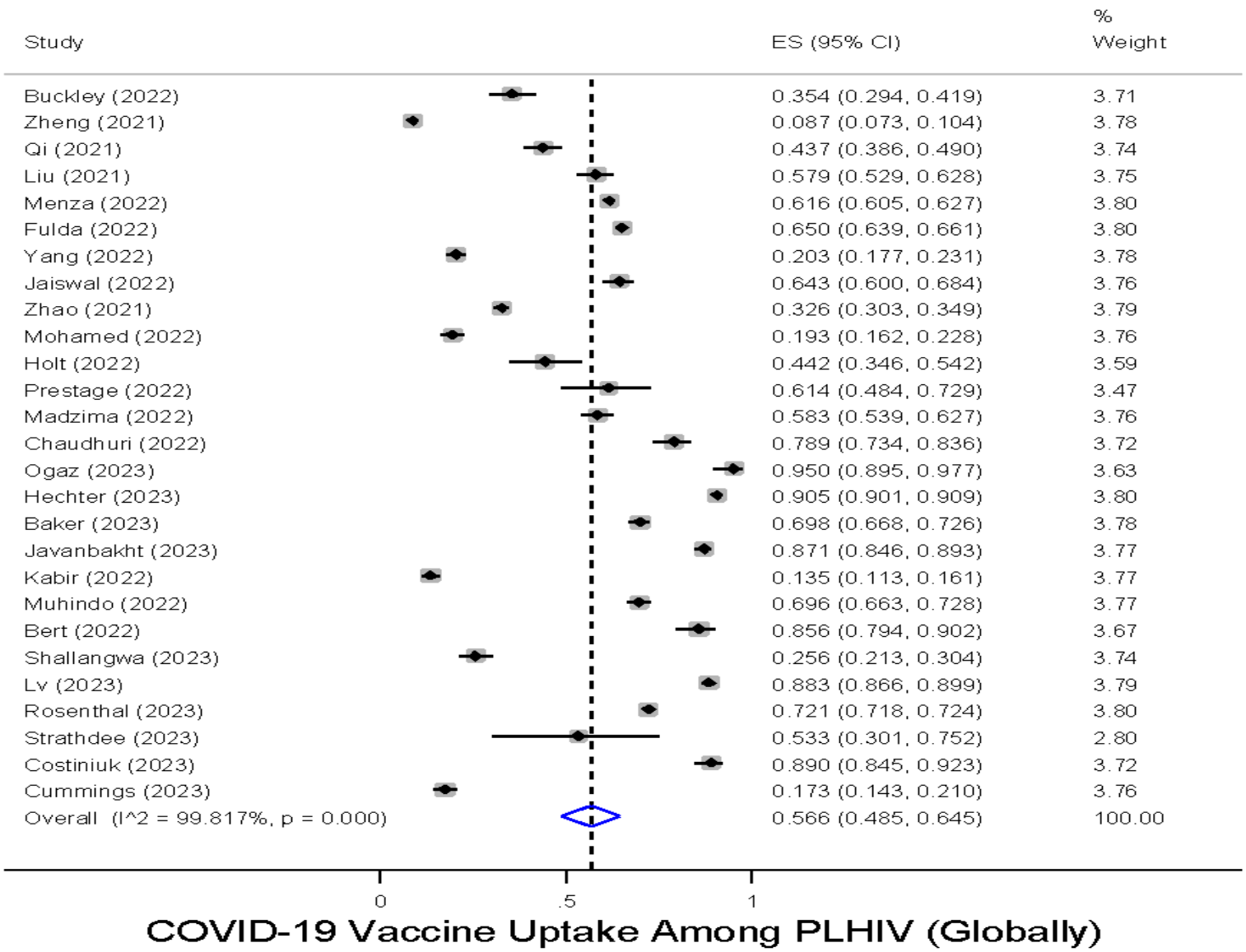
COVID-19 Vaccine Acceptance Among PLHIV (By Data Collection Method)

Supplementary Figure 7: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the data collection method employed (n = 53 studies, N = 166,455 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



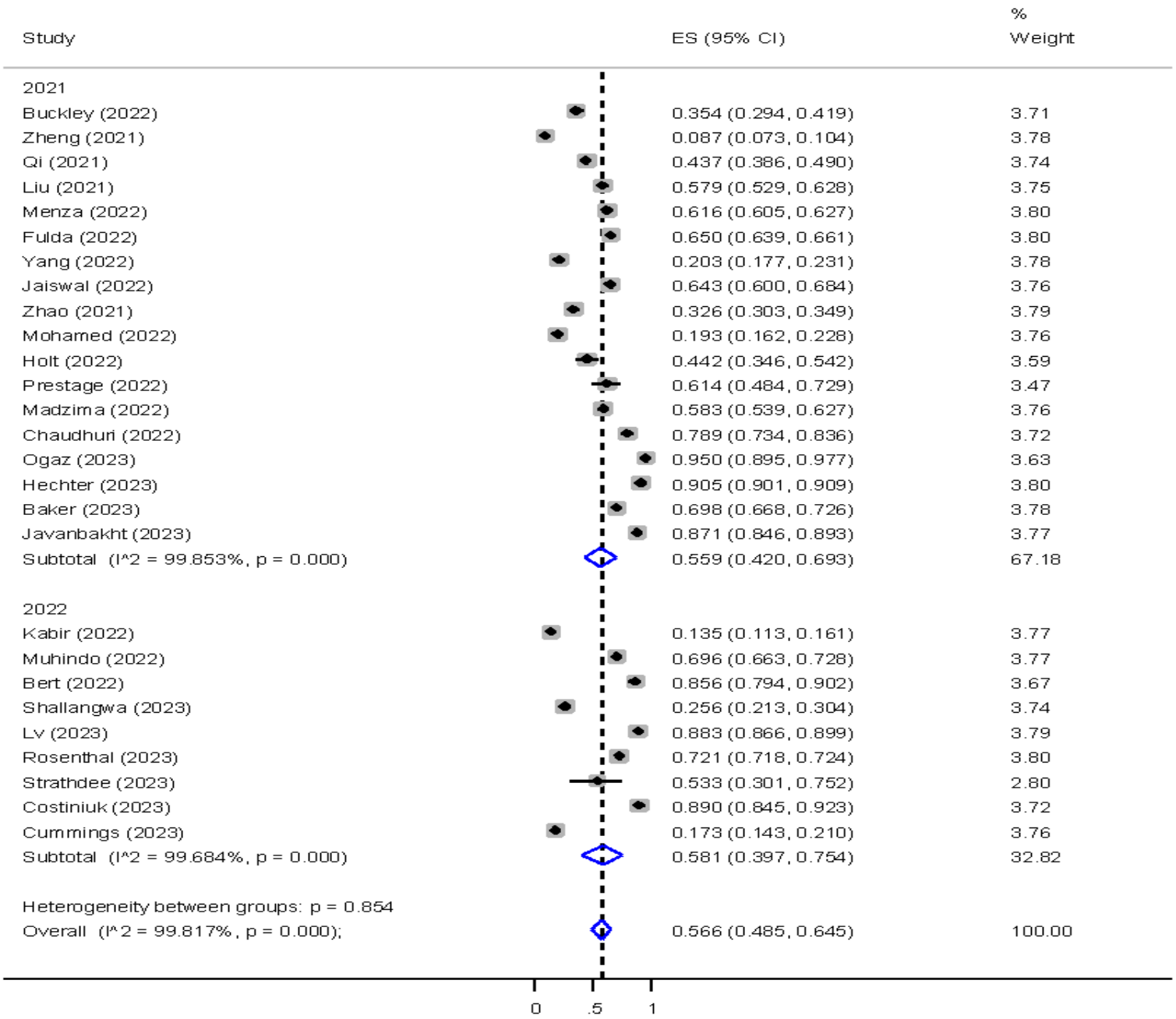
COVID-19 Vaccine Acceptance Among PLHIV (By Sampling Method)

Supplementary Figure 8: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the sampling method employed (n = 53 studies, N = 166,455 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



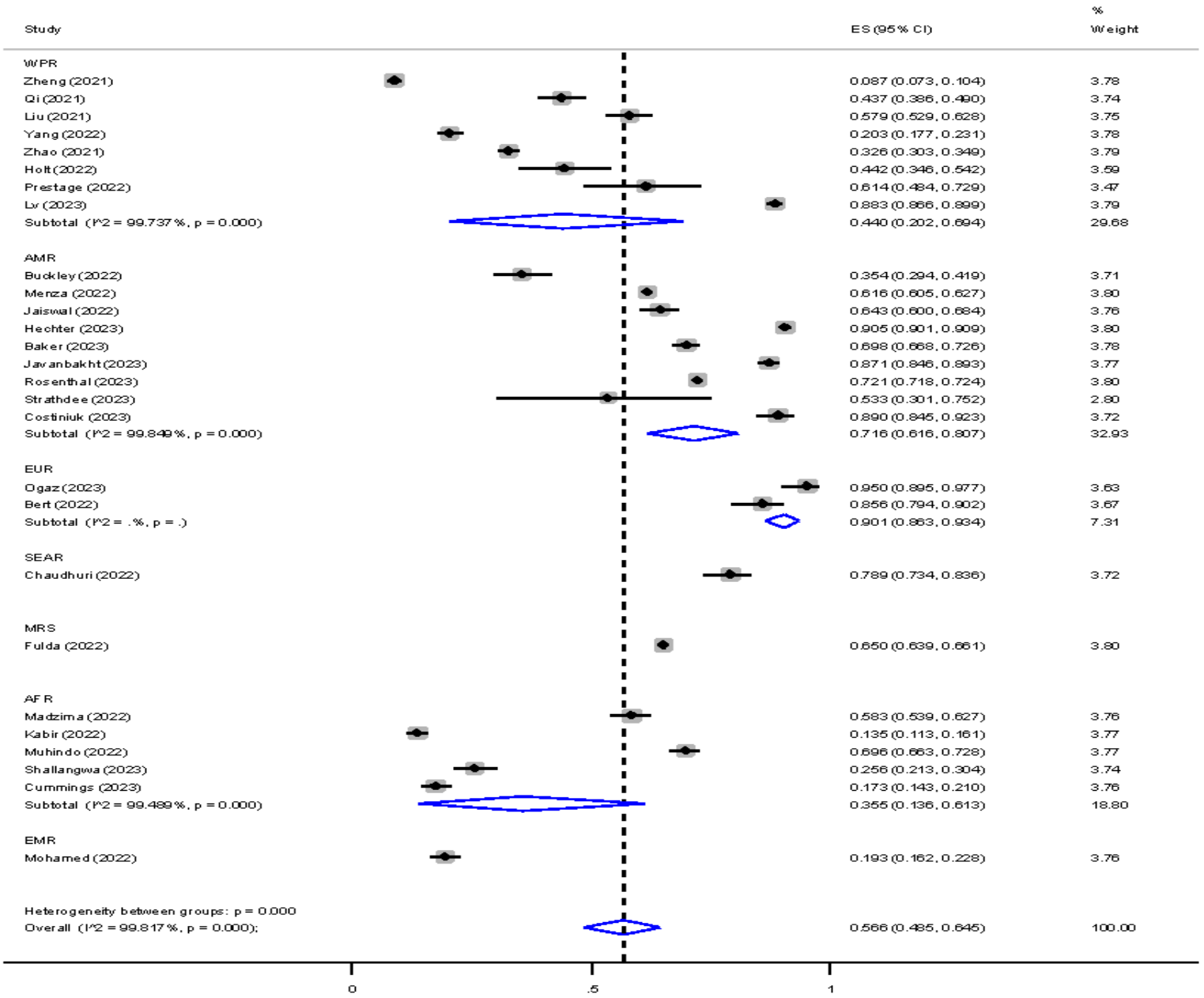
COVID-19 Vaccine Uptake Among PLHIV (Globally)

Supplementary Figure 9: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV globally (n = 27 studies, N = 150,926 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



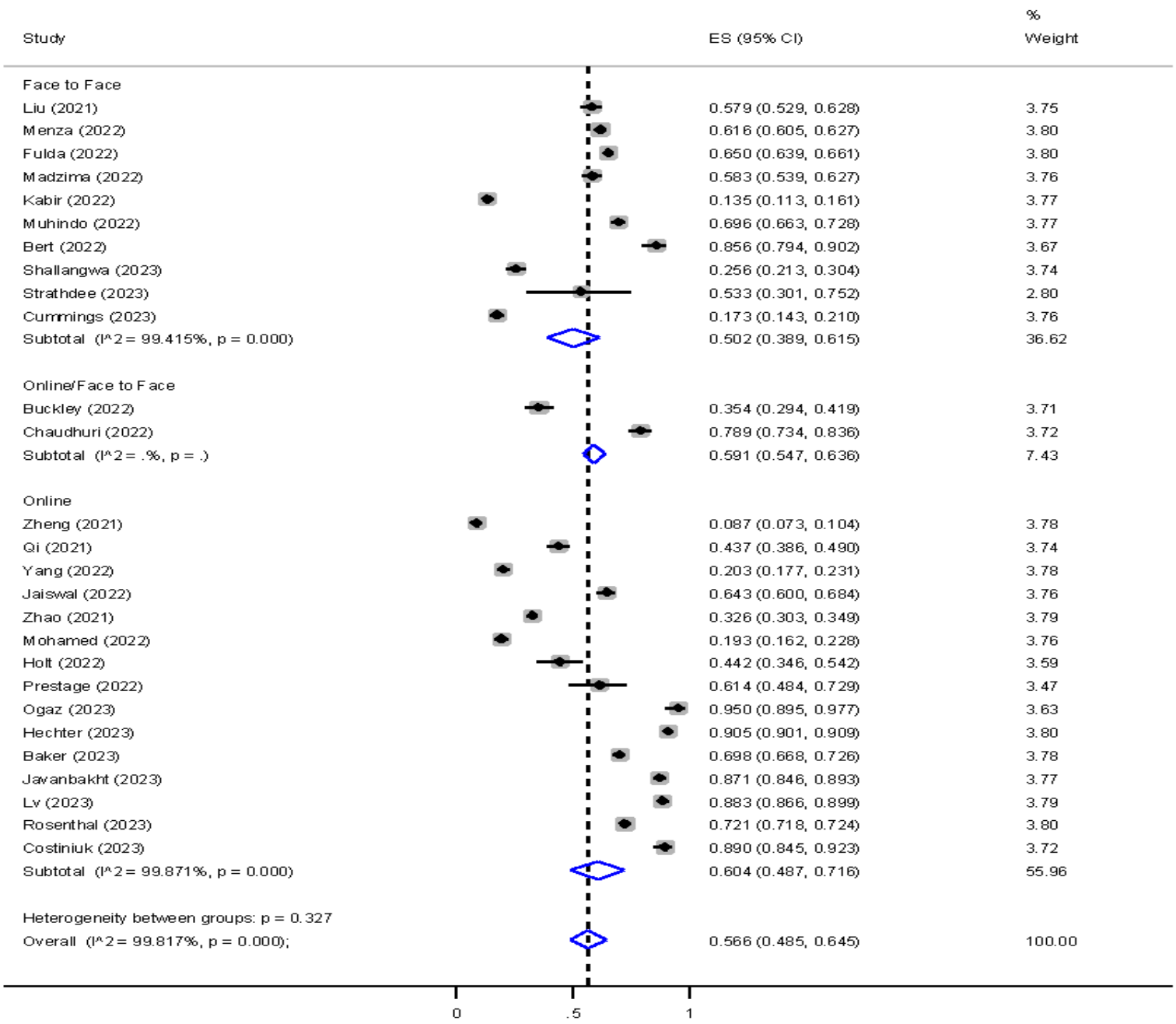
COVID-19 Vaccine Uptake Among PLHIV (By Study Year)

Supplementary Figure 10: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the study year (n = 27 studies, N = 150,926 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



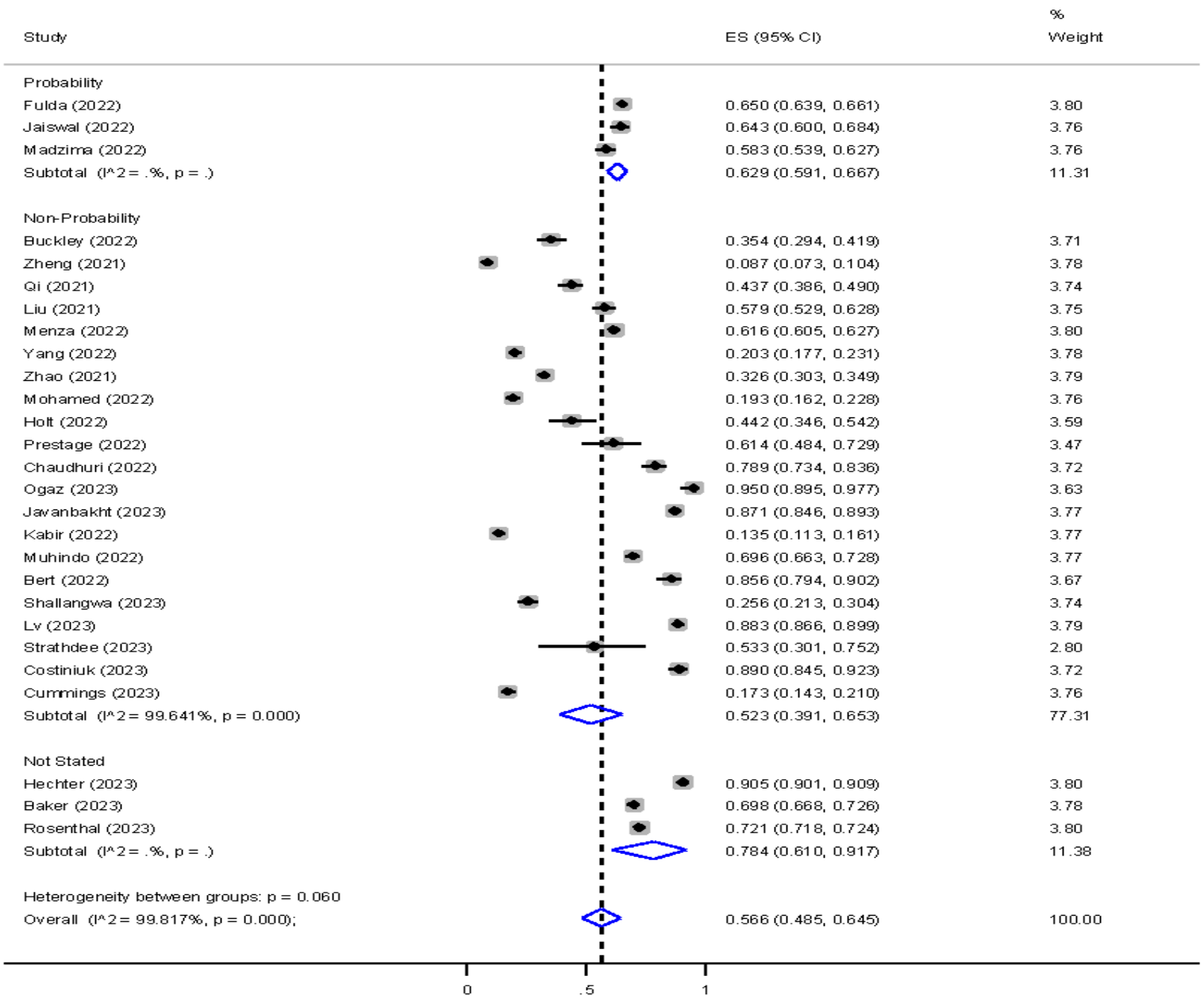
COVID-19 Vaccine uptake Among PLHIV (By WHO Region)

Supplementary Figure 11: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the WHO region (n = 27 studies, N = 150,926 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



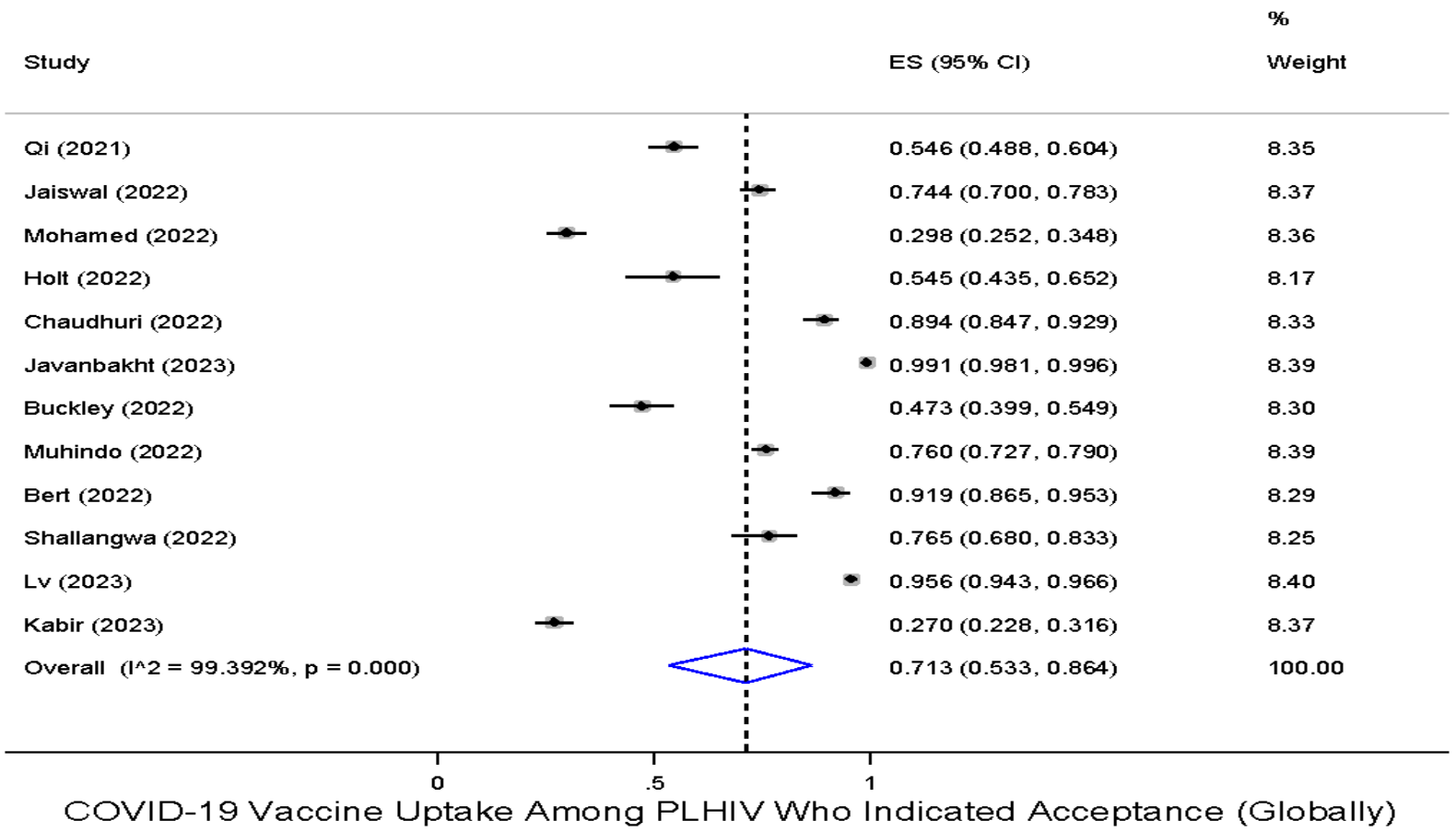
COVID-19 Vaccine uptake Among PLHIV (By Data Collection Method)

Supplementary Figure 12: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the data collection method (n = 27 studies, N = 150,926 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

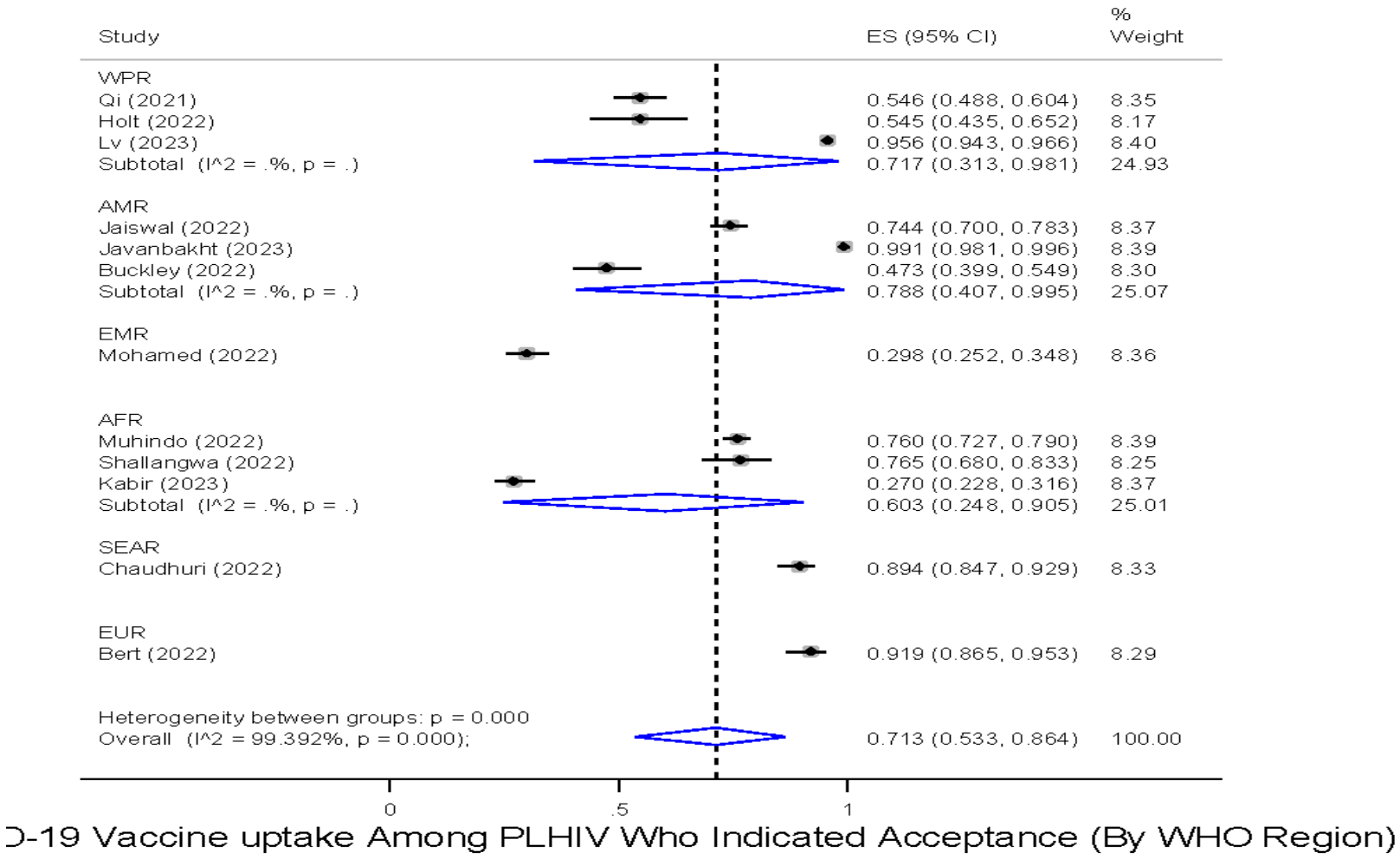


COVID-19 Vaccine Uptake Among PLHIV (By Sampling Method)

Supplementary Figure 13: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the sampling method employed (n = 27 studies, N = 150,926 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

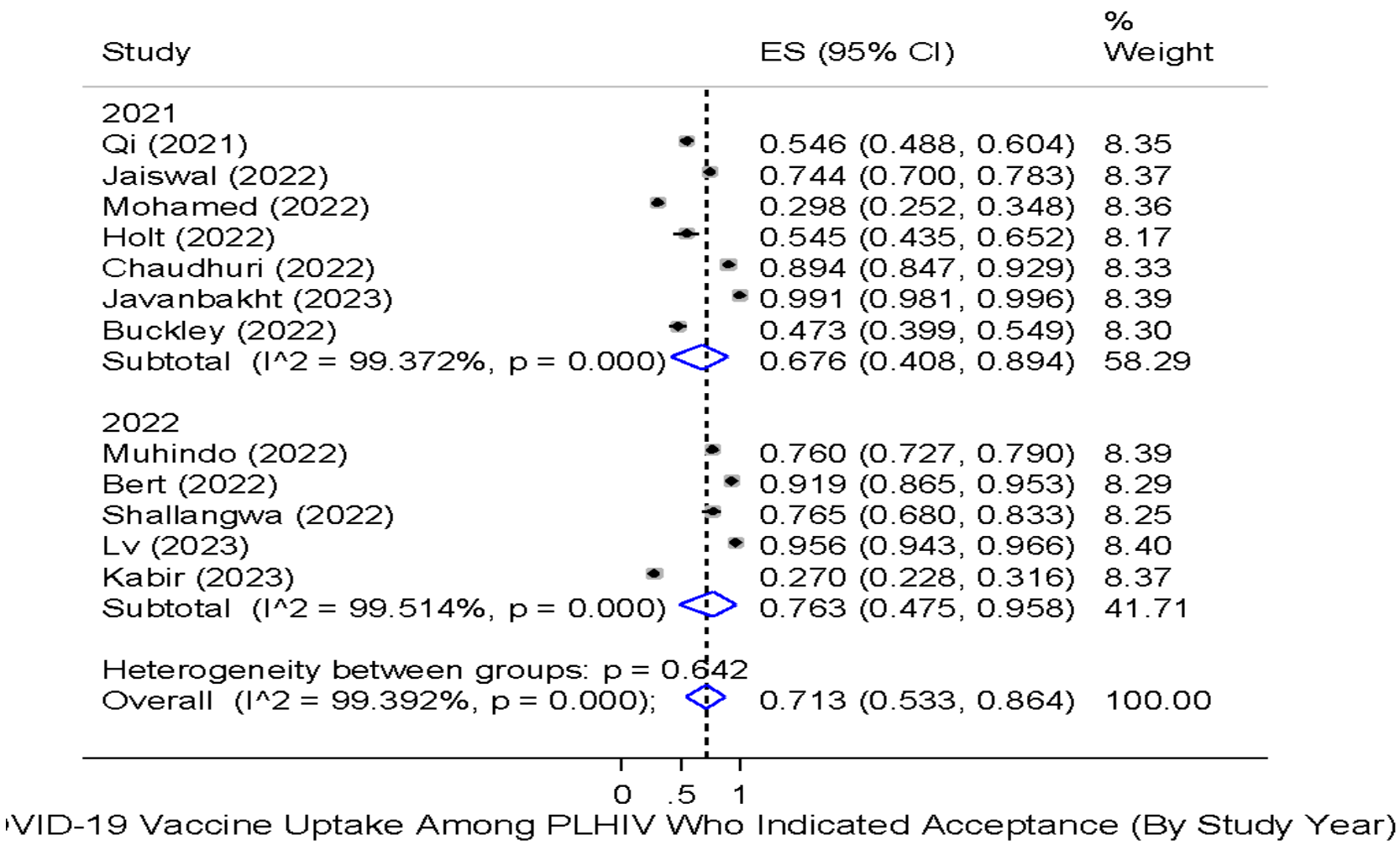


Supplementary Figure 14: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance globally (n = 13 studies, N = 6,186 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



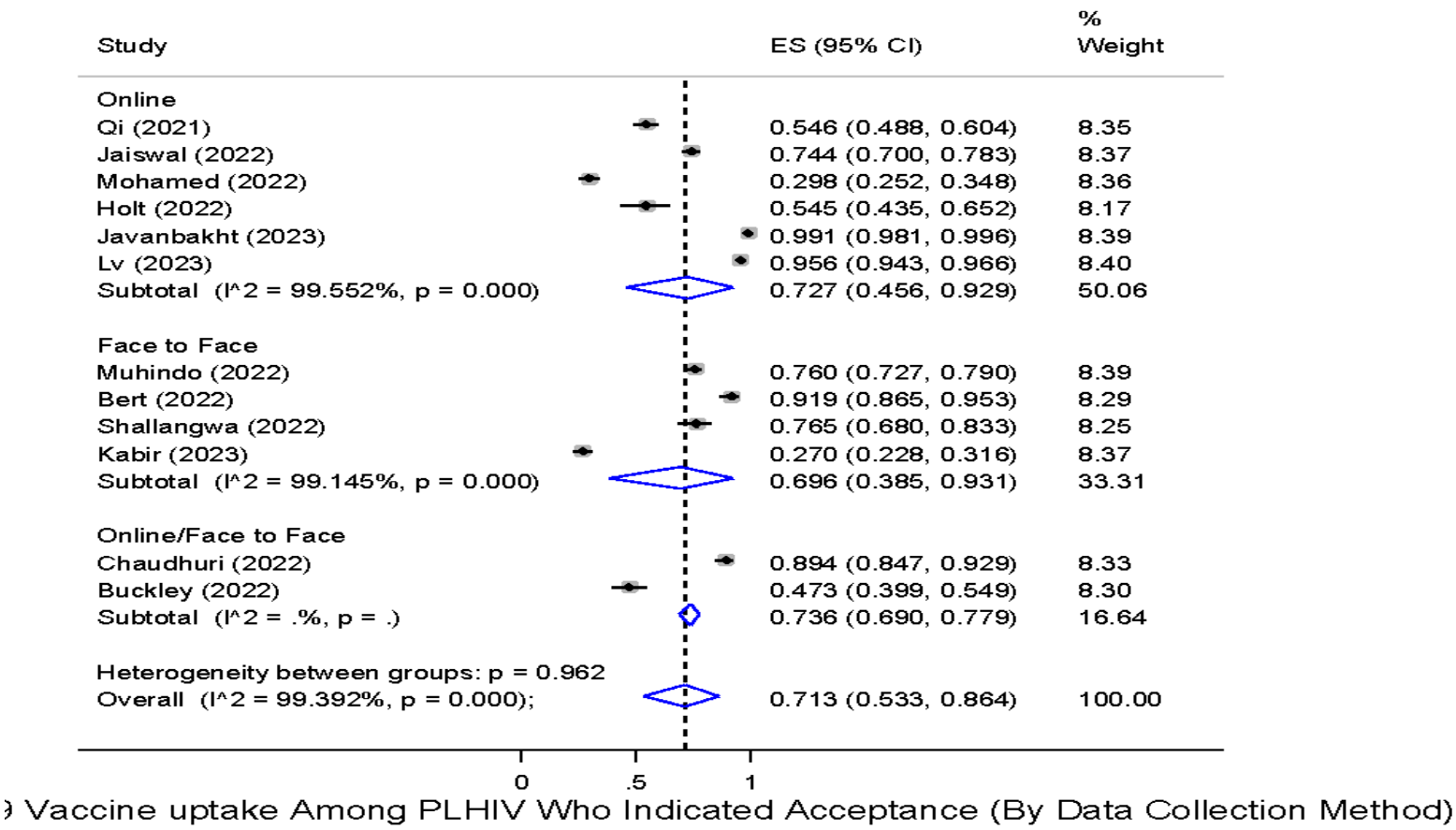
Supplementary Figure 15: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the WHO region (n = 13 studies, N = 6,186 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each

characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

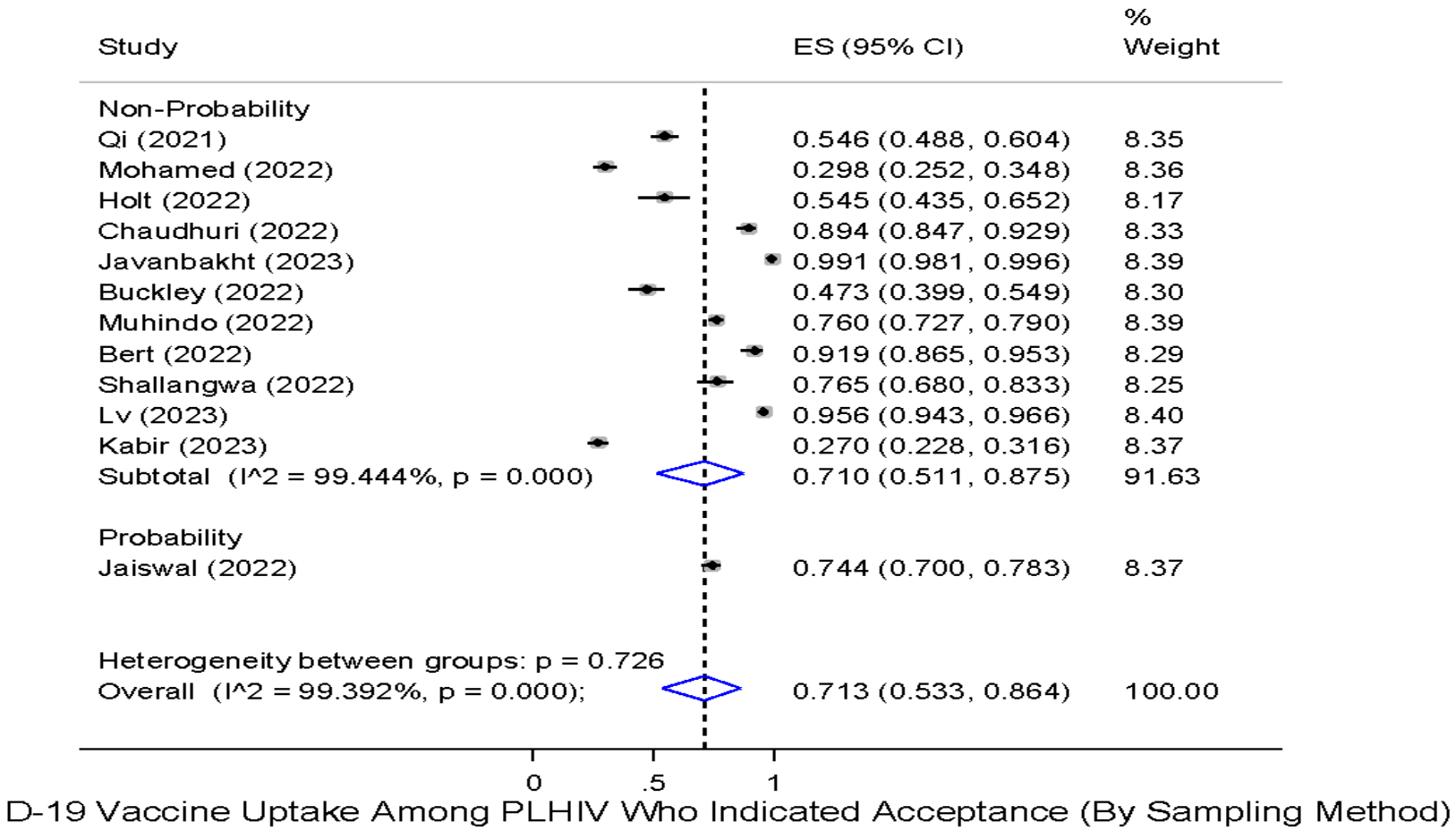


Supplementary Figure 16: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the study year (n = 13 studies, N = 6,186 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while

the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



Supplementary Figure 17: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the data collection method employed (n = 13 studies, N = 6,186 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



Supplementary Figure 18: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the sampling method employed (n = 13 studies, N = 6,186 participants) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each

characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

SECTION C

Results of the meta-analysis of COVID-19 vaccine acceptance and uptake using peer-reviewed studies only

Fig a: Begg's funnel plot of included studies

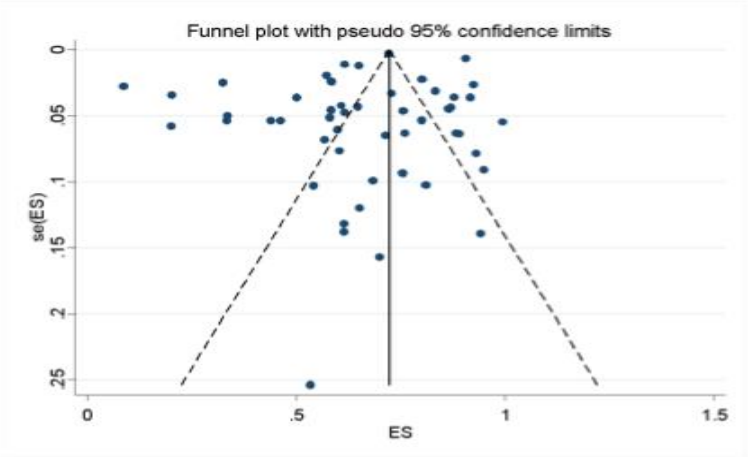
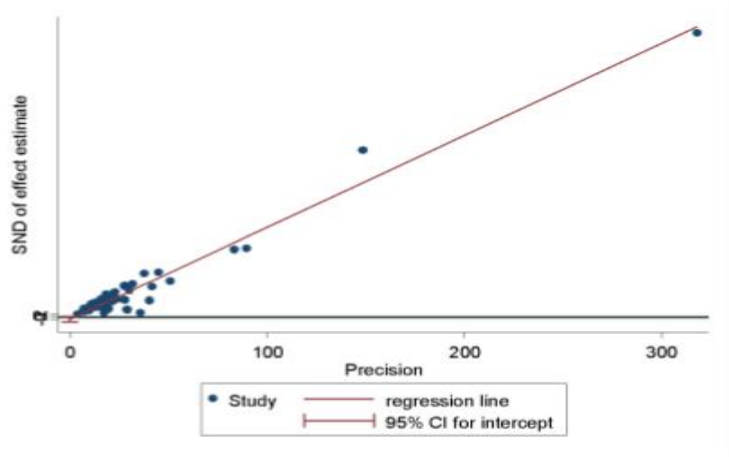


Figure b: Egger graph of included studies (P = 0.102)



Supplementary Figure 19: Publication bias assessment of studies reporting COVID-19 vaccine acceptance rate

Figure c: Begg's funnel plot of included studies

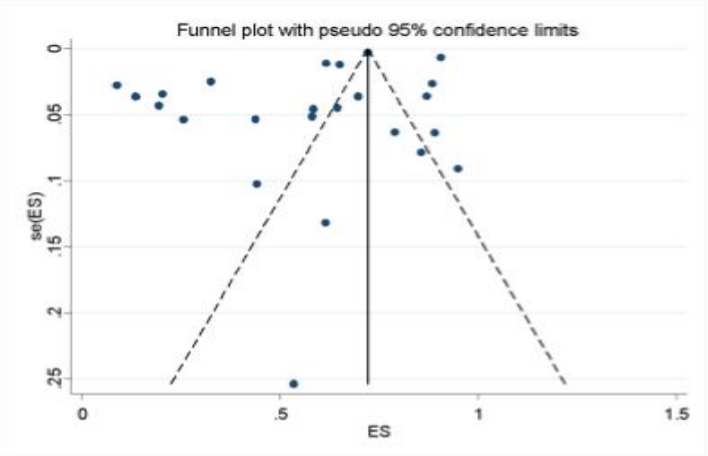
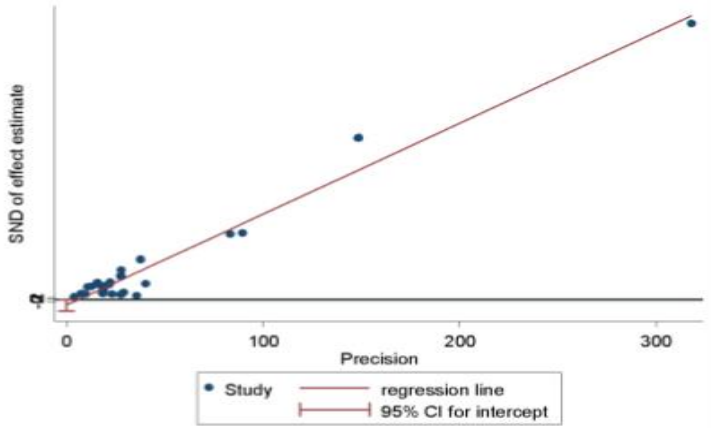


Figure d: Egger graph of included studies (P = 0.059)



Supplementary Figure 20: Publication bias assessment of studies reporting COVID-19 vaccine uptake rate

Figure e: Begg's funnel plot of included studies

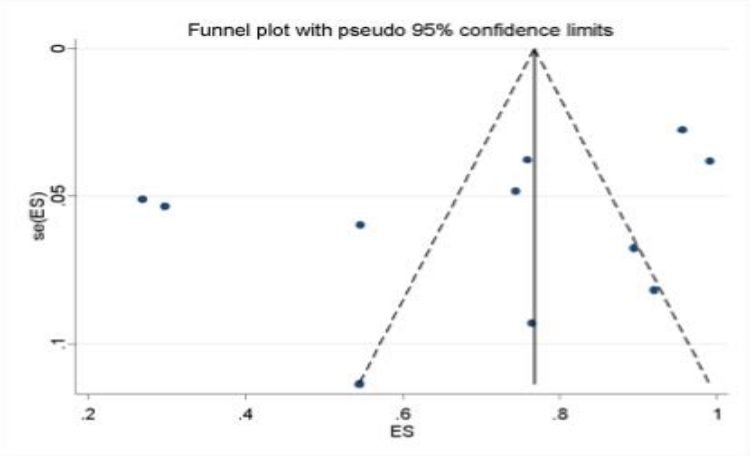
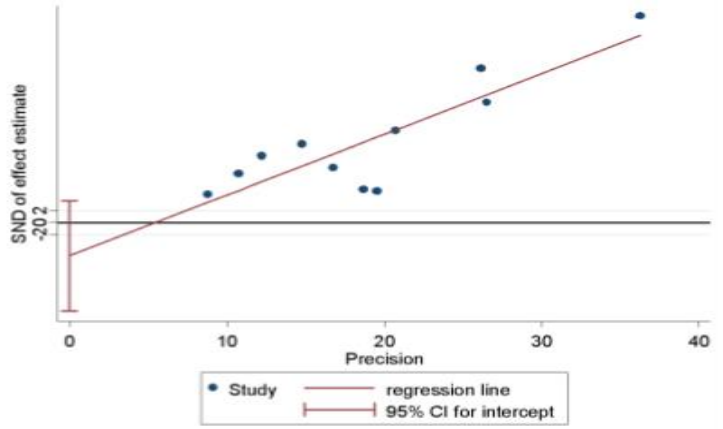
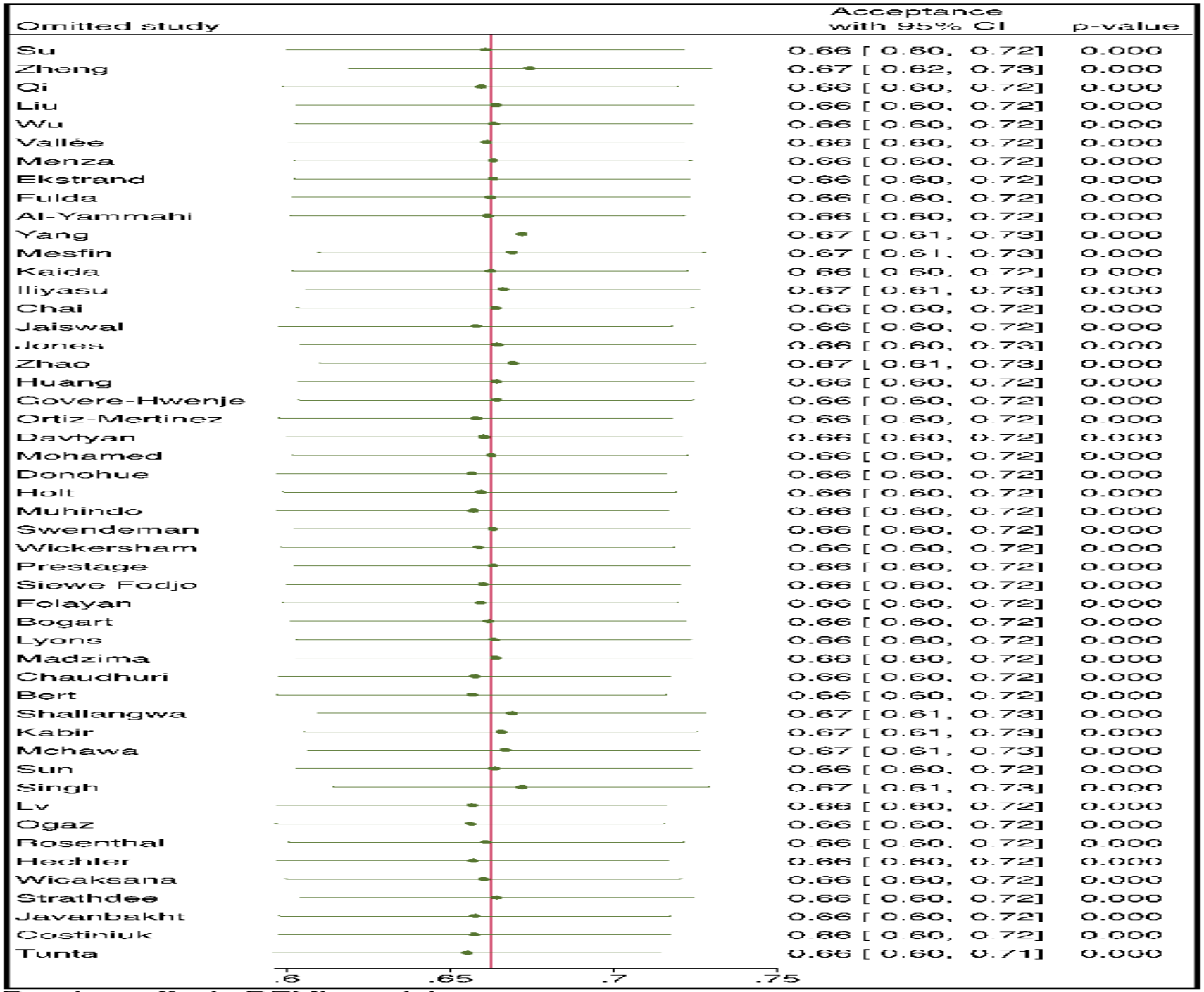


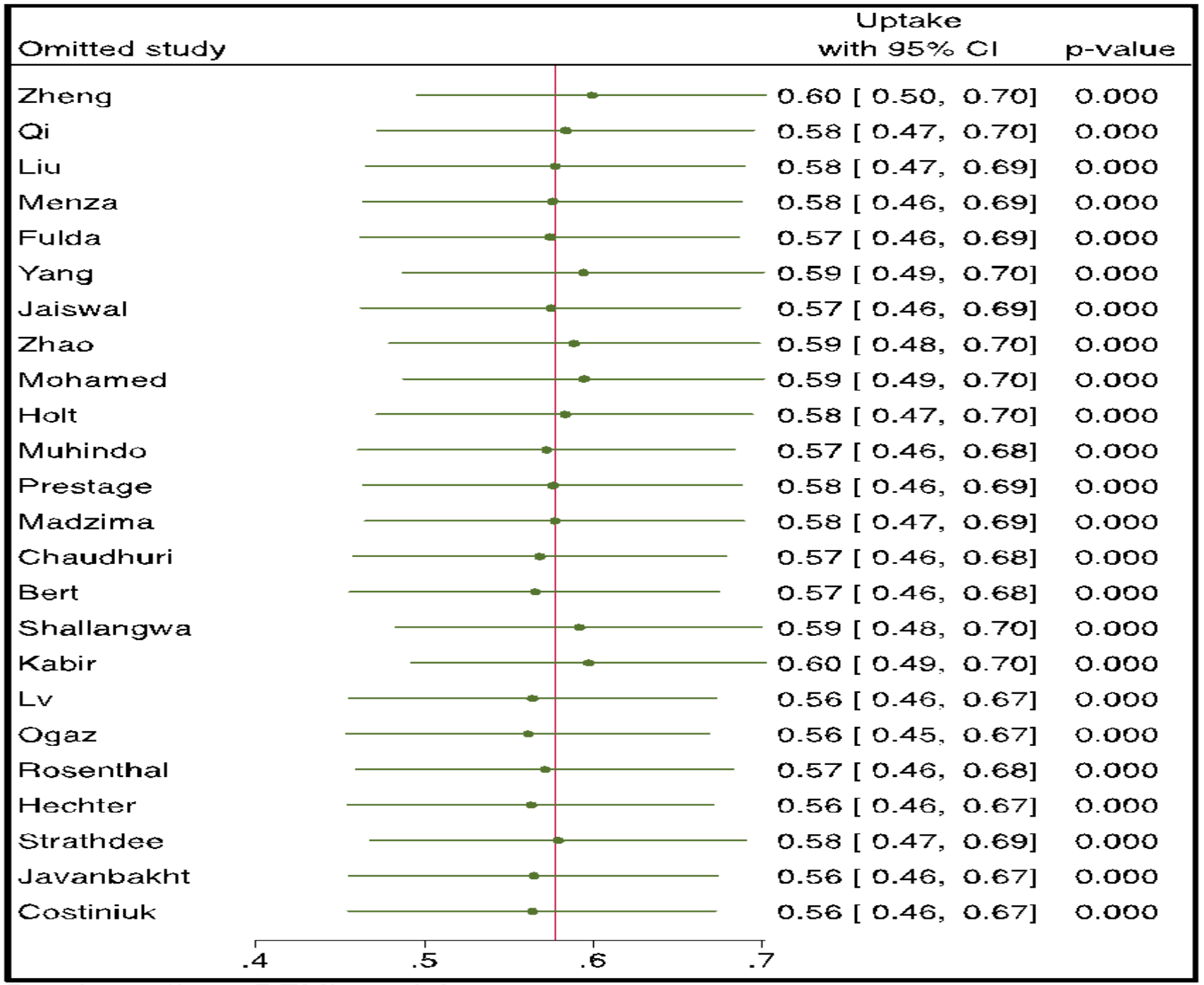
Figure f: Egger graph of included studies (P = 0.203)



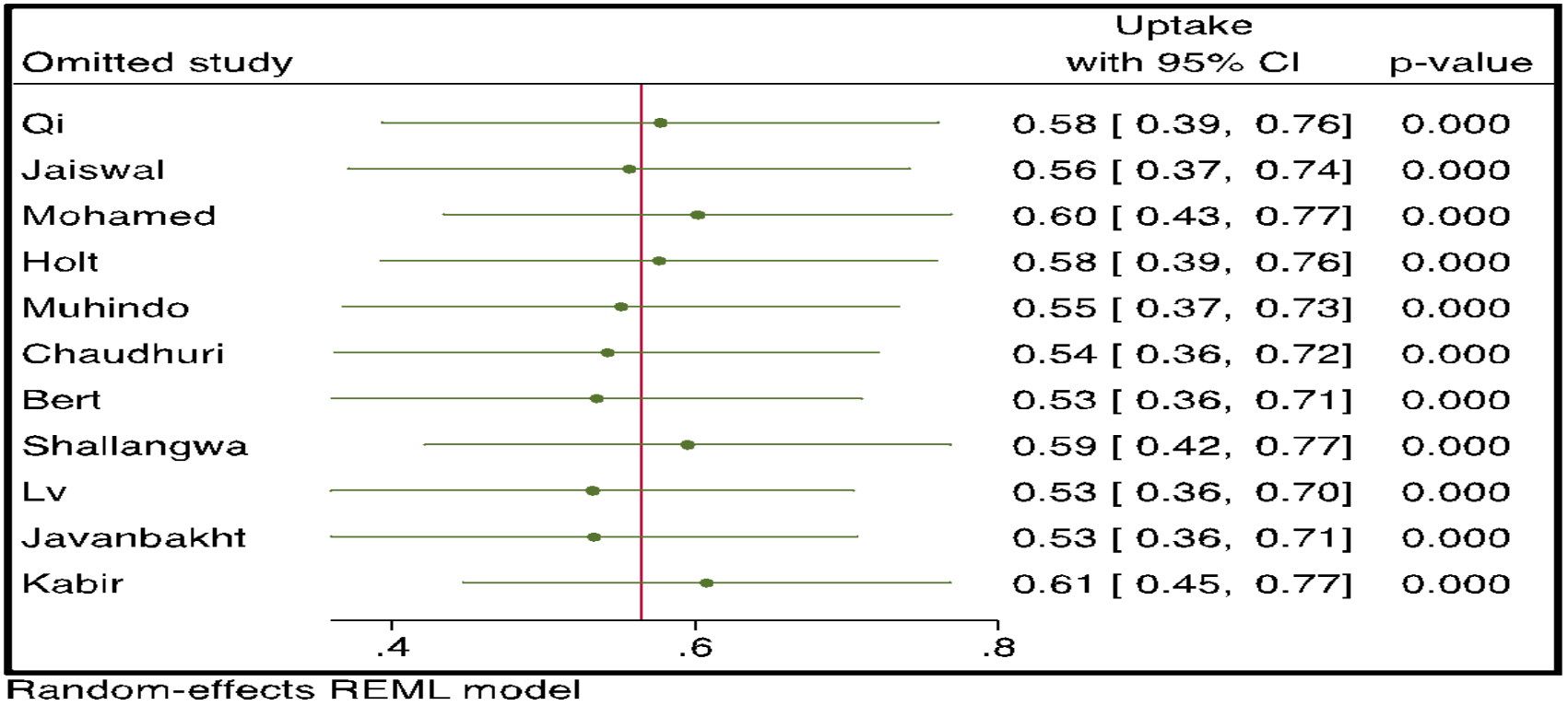
Supplementary Figure 21: Assessment of publication bias among studies reporting each of the three outcomes. All the statistical tests were two-sided. ES, Effect Size. a, Begg's funnel plot of included studies reporting acceptance rate (n = 50 studies). **b,** Egger graph of included studies reporting acceptance rate (n = 50 studies). **c,** Begg's funnel plot of included studies reporting uptake rate (n = 24 studies). **d,** Egger graph of included studies reporting uptake rate (n = 24 studies). **e,** Begg's funnel plot of studies reporting uptake rate in PLHIV who indicated acceptance (n = 12 studies). **f,** Egger graph of studies reporting uptake among accepting group (n = 12 studies).


Omitted study
Acceptance with 95% CI
p-value
Su 0.66 [0.60, 0.72] 0.000
Zheng 0.67 [0.62, 0.73] 0.000
Qi 0.66 [0.60, 0.72] 0.000
Liu 0.66 [0.60, 0.72] 0.000
Wu 0.66 [0.60, 0.72] 0.000
Vallée 0.66 [0.60, 0.72] 0.000
Menza 0.66 [0.60, 0.72] 0.000
Ekstrand 0.66 [0.60, 0.72] 0.000
Fulda 0.66 [0.60, 0.72] 0.000
Al-Yammahi 0.66 [0.60, 0.72] 0.000
Yang 0.67 [0.61, 0.73] 0.000
Mesfin 0.67 [0.61, 0.73] 0.000
Kaida 0.66 [0.60, 0.72] 0.000
Iliyasu 0.67 [0.61, 0.73] 0.000
Chai 0.66 [0.60, 0.72] 0.000
Jaiswal 0.66 [0.60, 0.72] 0.000
Jones 0.66 [0.60, 0.73] 0.000
Zhao 0.67 [0.61, 0.73] 0.000
Huang 0.66 [0.60, 0.72] 0.000
Govere-Hwenje 0.66 [0.60, 0.72] 0.000
Ortiz-Mertinez 0.66 [0.60, 0.72] 0.000
Davtyan 0.66 [0.60, 0.72] 0.000
Mohamed 0.66 [0.60, 0.72] 0.000
Donohue 0.66 [0.60, 0.72] 0.000
Holt 0.66 [0.60, 0.72] 0.000
Muhindo 0.66 [0.60, 0.72] 0.000
Swendeman 0.66 [0.60, 0.72] 0.000
Wickersham 0.66 [0.60, 0.72] 0.000
Prestage 0.66 [0.60, 0.72] 0.000
Siewe Fodjo 0.66 [0.60, 0.72] 0.000
Folayan 0.66 [0.60, 0.72] 0.000
Bogart 0.66 [0.60, 0.72] 0.000
Lyons 0.66 [0.60, 0.72] 0.000
Madzima 0.66 [0.60, 0.72] 0.000
Chaudhuri 0.66 [0.60, 0.72] 0.000
Bert 0.66 [0.60, 0.72] 0.000
Shallangwa 0.67 [0.61, 0.73] 0.000
Kabir 0.67 [0.61, 0.73] 0.000
Mchawa 0.67 [0.61, 0.73] 0.000
Sun 0.66 [0.60, 0.72] 0.000
Singh 0.67 [0.61, 0.73] 0.000
Lv 0.66 [0.60, 0.72] 0.000
Ogaz 0.66 [0.60, 0.72] 0.000
Rosenthal 0.66 [0.60, 0.72] 0.000
Hechter 0.66 [0.60, 0.72] 0.000
Wicaksana 0.66 [0.60, 0.72] 0.000
Strathdee 0.66 [0.60, 0.72] 0.000
Javanbakht 0.66 [0.60, 0.72] 0.000
Costiniuk 0.66 [0.60, 0.72] 0.000
Tunta 0.66 [0.60, 0.71] 0.000
.6
.65
.7
.75
Random-effects REML model

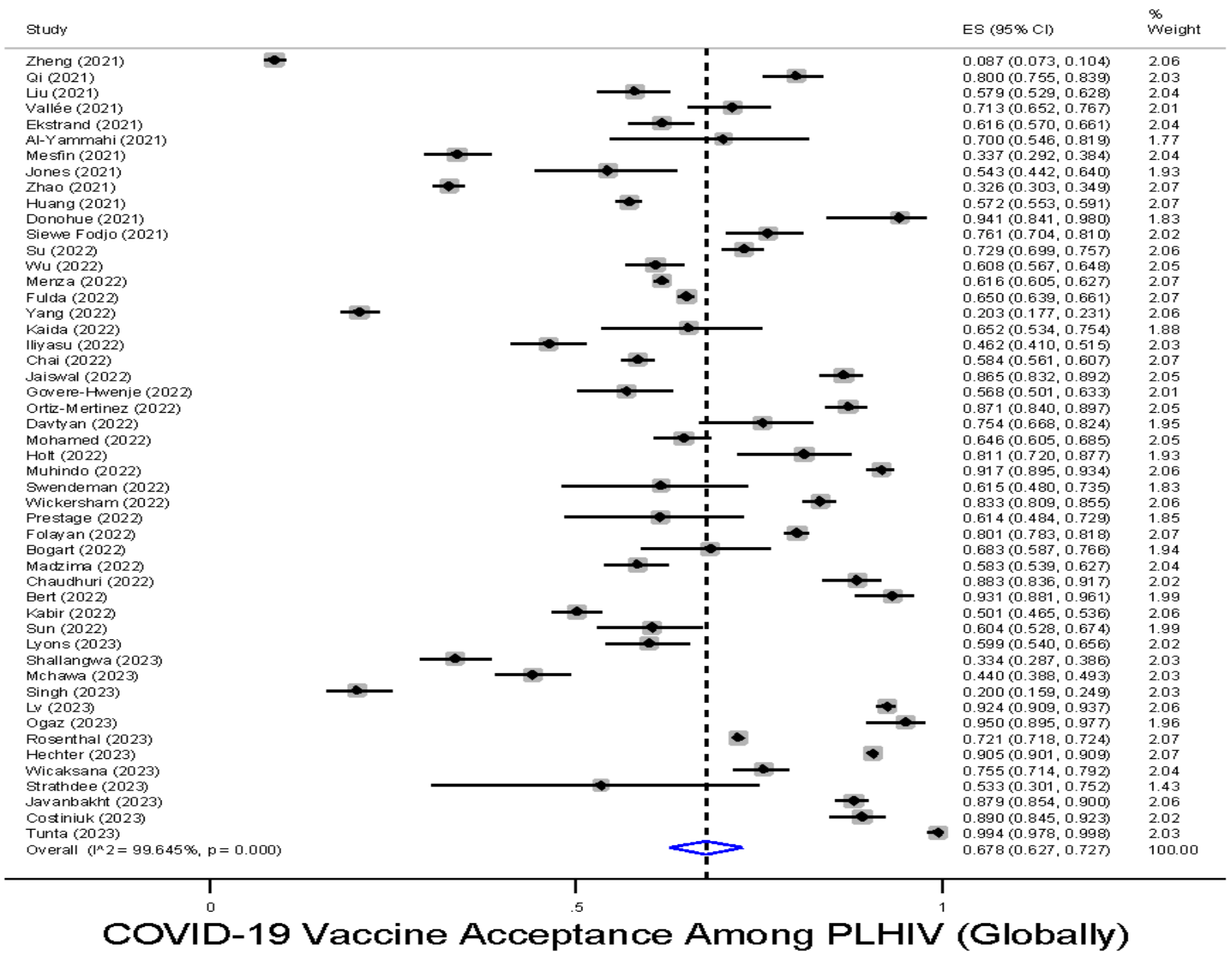
Supplementary Figure 22: Forest plot of sensitivity analyses for each study reporting the acceptance rate of the COVID-19 vaccine among PLHIV using random effects model meta-analysis. Each solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. (n = 50 studies).


Omitted study
Uptake with 95% CI
p-value
Zheng 0.60 [0.50, 0.70] 0.000
Qi 0.58 [0.47, 0.70] 0.000
Liu 0.58 [0.47, 0.69] 0.000
Menza 0.58 [0.46, 0.69] 0.000
Fulda 0.57 [0.46, 0.69] 0.000
Yang 0.59 [0.49, 0.70] 0.000
Jaiswal 0.57 [0.46, 0.69] 0.000
Zhao 0.59 [0.48, 0.70] 0.000
Mohamed 0.59 [0.49, 0.70] 0.000
Holt 0.58 [0.47, 0.70] 0.000
Muhindo 0.57 [0.46, 0.68] 0.000
Prestage 0.58 [0.46, 0.69] 0.000
Madzima 0.58 [0.47, 0.69] 0.000
Chaudhuri 0.57 [0.46, 0.68] 0.000
Bert 0.57 [0.46, 0.68] 0.000
Shallangwa 0.59 [0.48, 0.70] 0.000
Kabir 0.60 [0.49, 0.70] 0.000
Lv 0.56 [0.46, 0.67] 0.000
Ogaz 0.56 [0.45, 0.67] 0.000
Rosenthal 0.57 [0.46, 0.68] 0.000
Hechter 0.56 [0.46, 0.67] 0.000
Strathdee 0.58 [0.47, 0.69] 0.000
Javanbakht 0.56 [0.46, 0.67] 0.000
Costiniuk 0.56 [0.46, 0.67] 0.000
.4
.5
.6
.7
Random-effects REML model

Supplementary Figure 23: Forest plot of sensitivity analyses for each study reporting the uptake rate of the COVID-19 vaccine among PLHIV using random effects model meta-analysis. Each solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. (n = 24 studies).

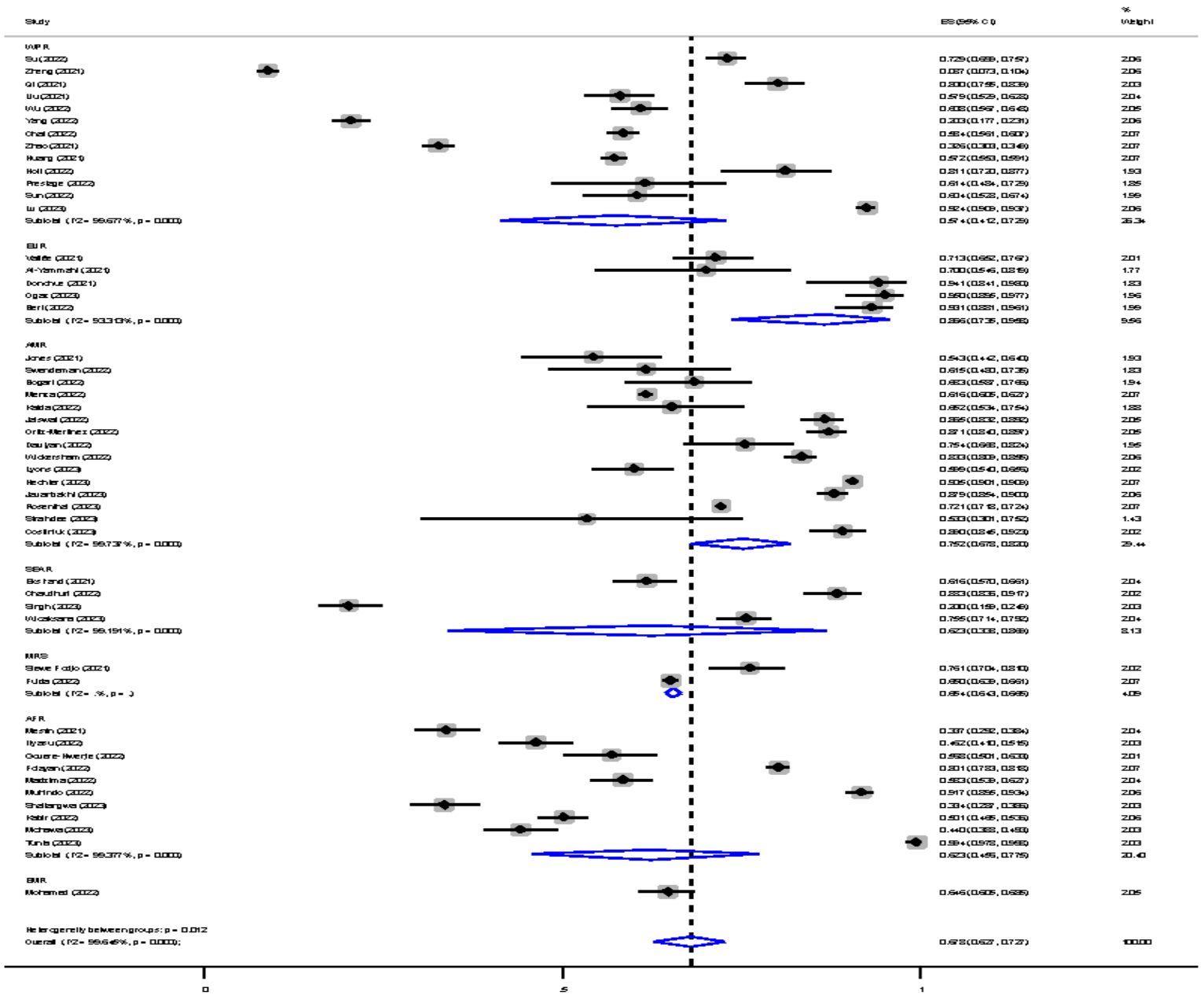


Supplementary Figure 24: Forest plot of sensitivity analyses for each study reporting the uptake rate of the COVID-19 vaccine among PLHIV who indicated acceptance using random effects model meta-analysis. Each solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. (n = 12 studies).



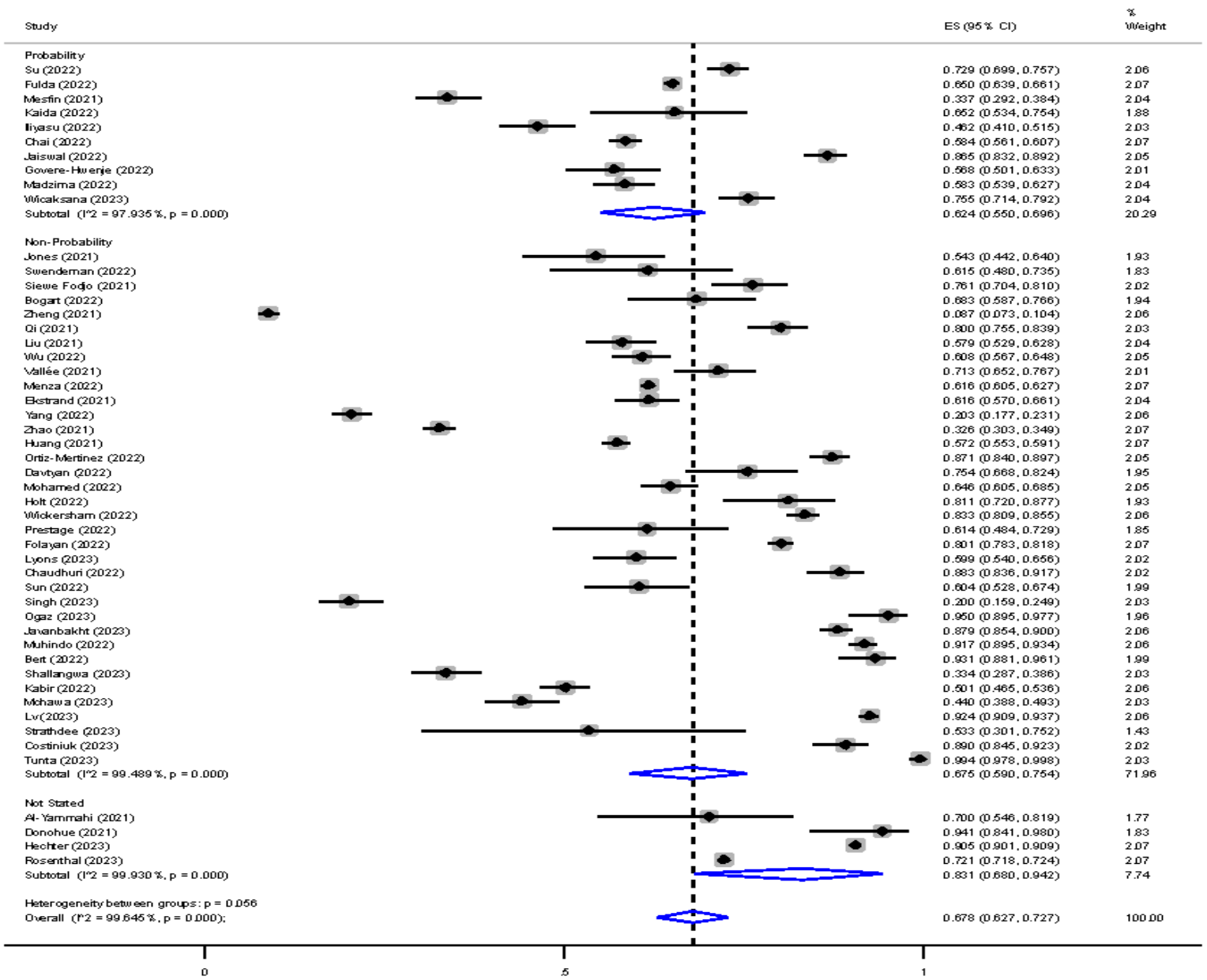
COVID-19 Vaccine Acceptance Among PLHIV (Globally)

Supplementary Figure 25: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance globally (n = 50 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



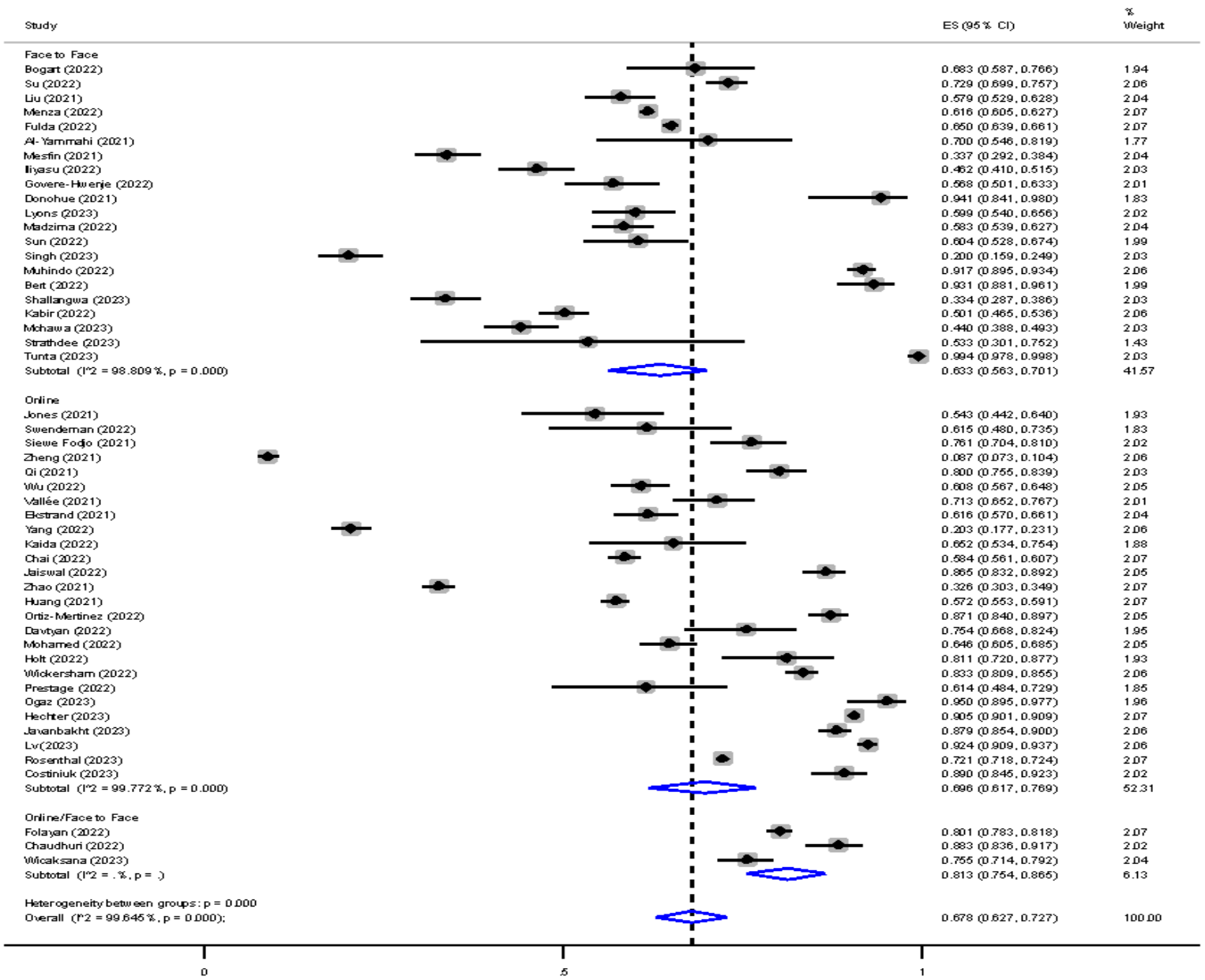
COVID-19 Vaccine Acceptance Among PLHIV (By WHO Region)

Supplementary Figure 26: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the WHO region (n = 50 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



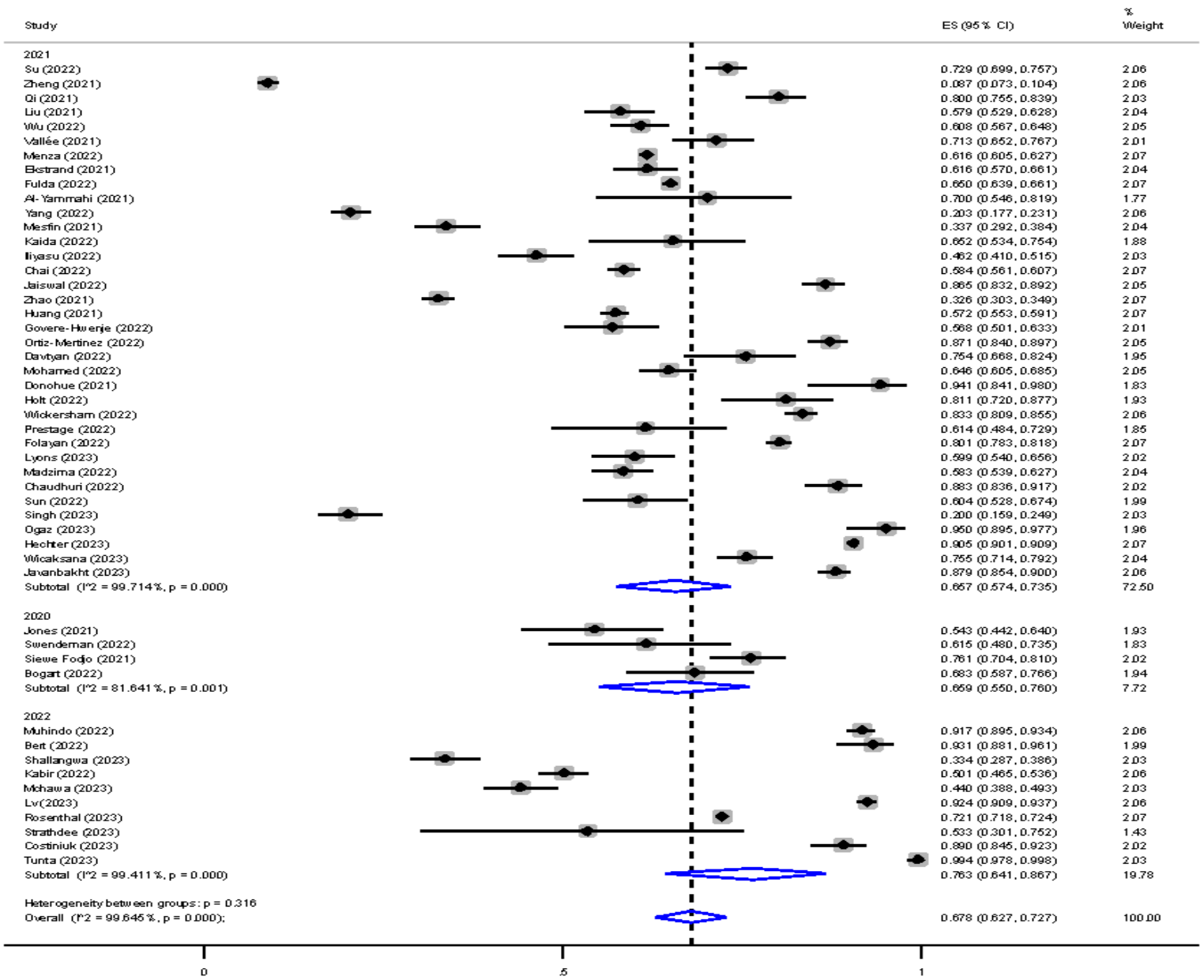
COVID-19 Vaccine Acceptance Among PLHIV (By Sampling Method)

Supplementary Figure 27: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the sampling method employed (n = 50 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



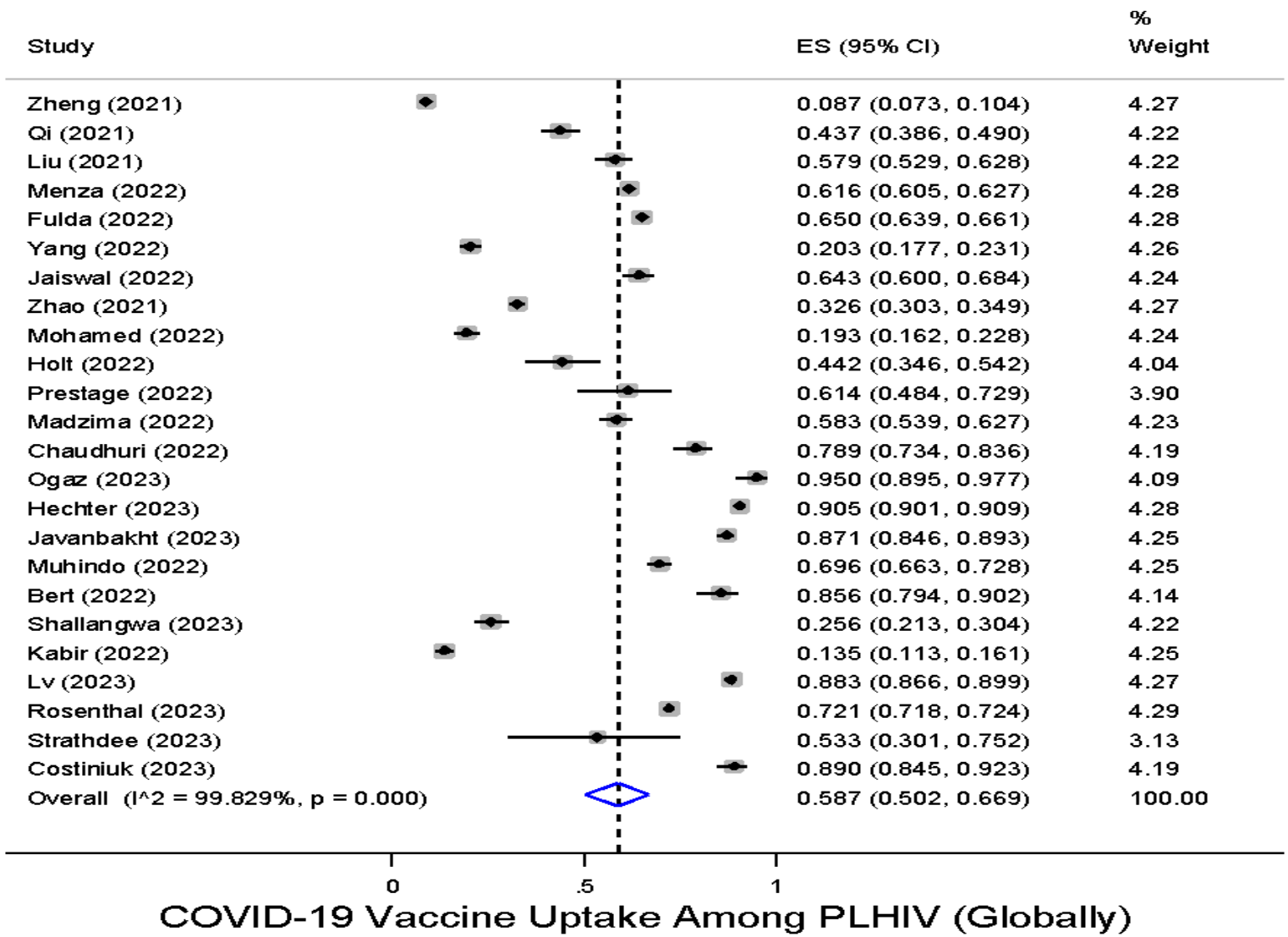
COVID-19 Vaccine Acceptance Among PLHIV (By Data Collection Method)[66]

Supplementary Figure 28: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the data collection method (n = 50 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



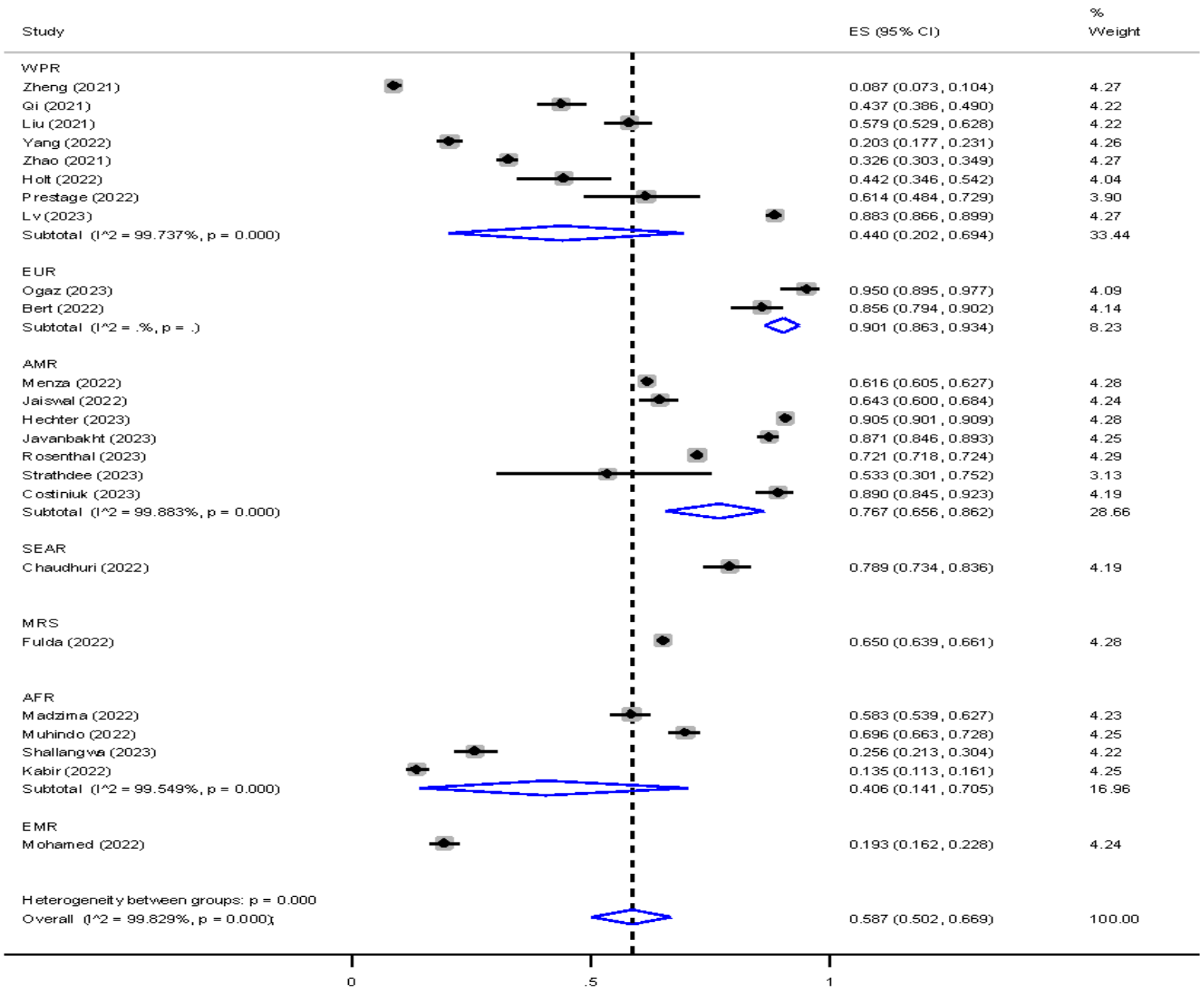
COVID-19 Vaccine Acceptance Among PLHIV (By Study Year)

Supplementary Figure 29: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine acceptance according to the study year (n = 50 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



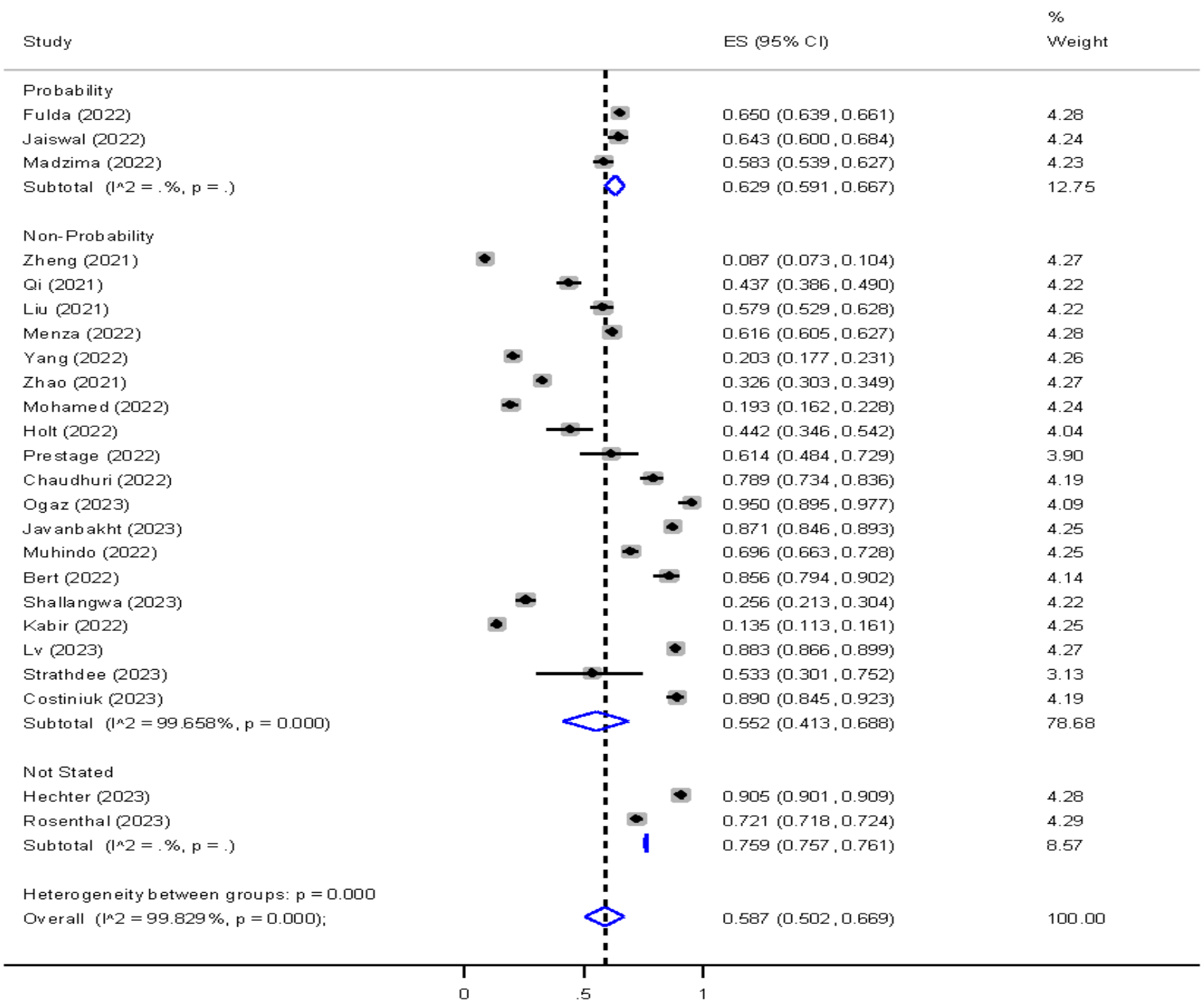
COVID-19 Vaccine Uptake Among PLHIV (Globally)

Supplementary Figure 30: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV globally (n = 24 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



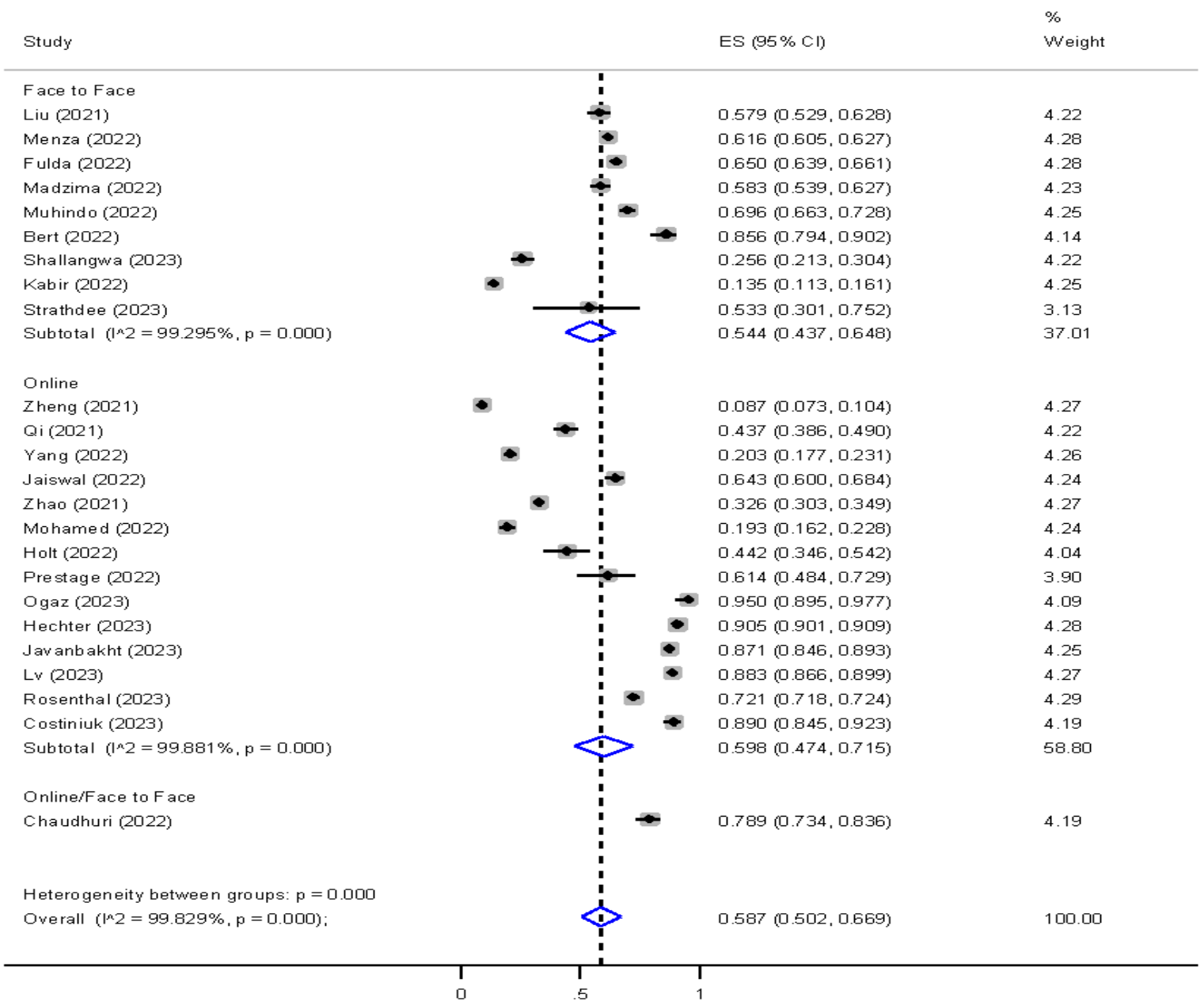
COVID-19 Vaccine uptake Among PLHIV (By WHO Region)

Supplementary Figure 31: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the WHO region (n = 24 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



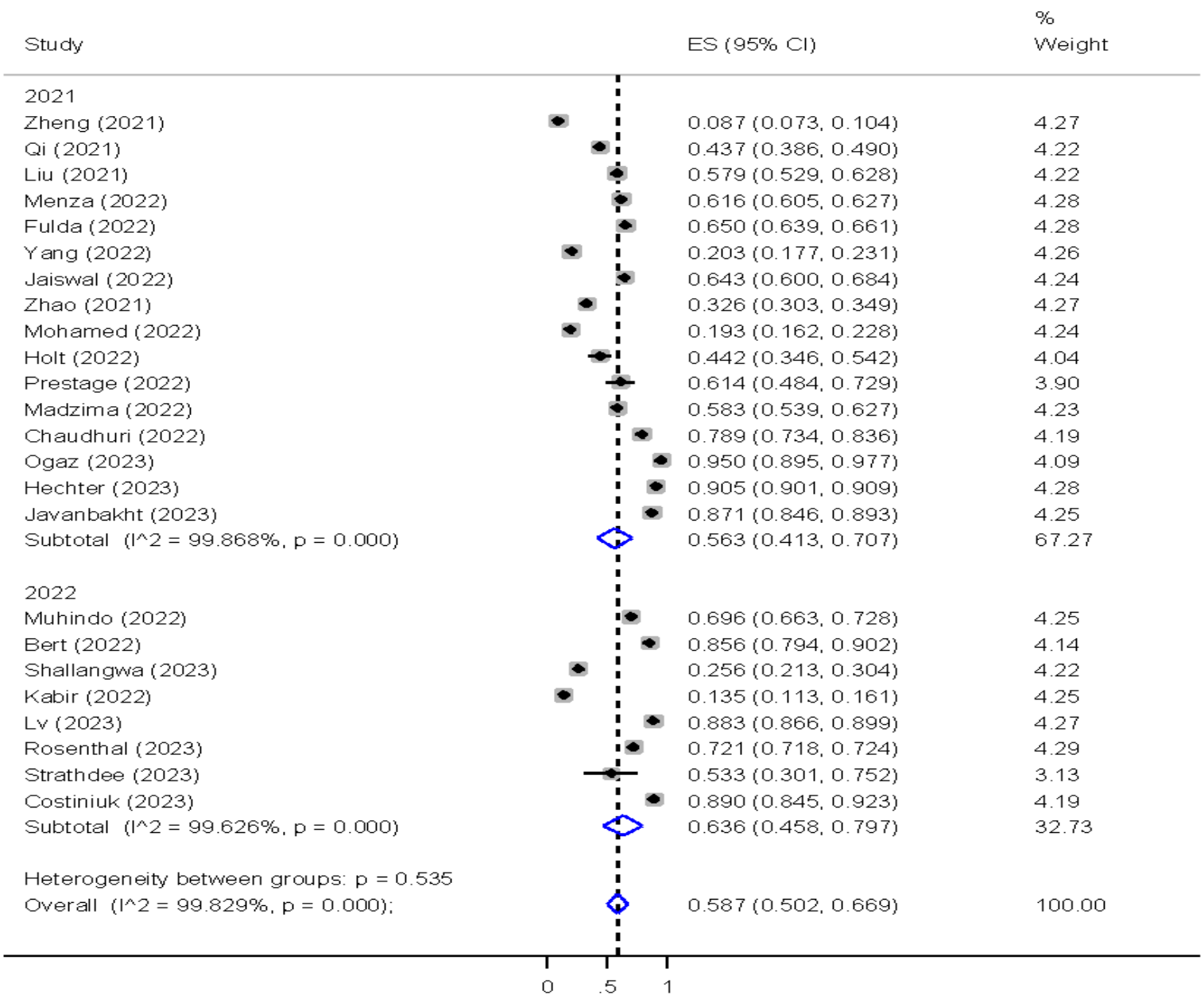
COVID-19 Vaccine Uptake Among PLHIV (By Sampling Method)

Supplementary Figure 32: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the sampling method (n = 24 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



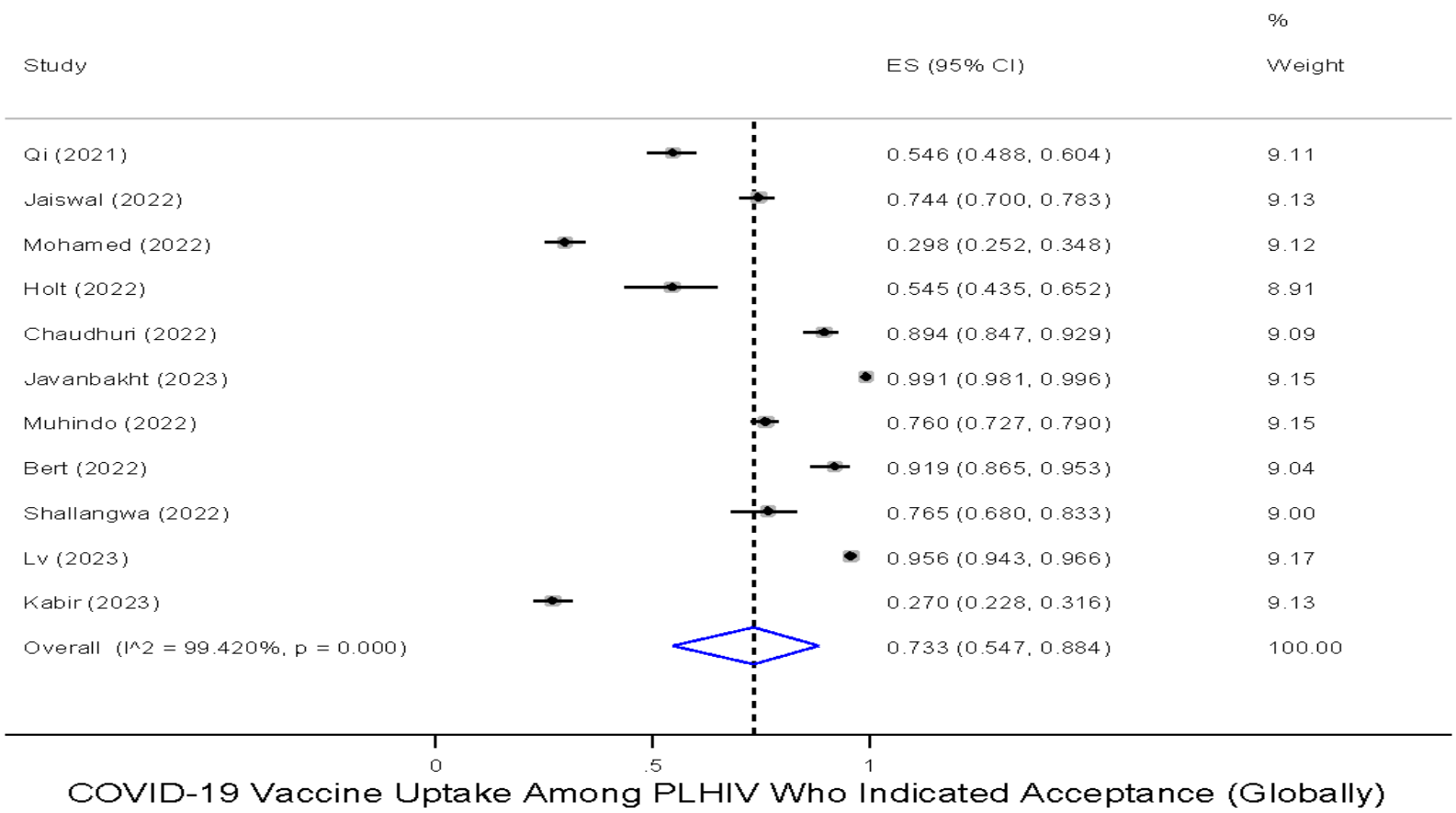
COVID-19 Vaccine uptake Among PLHIV (By Data Collection Method)

Supplementary Figure 33: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the data collection method (n = 24 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

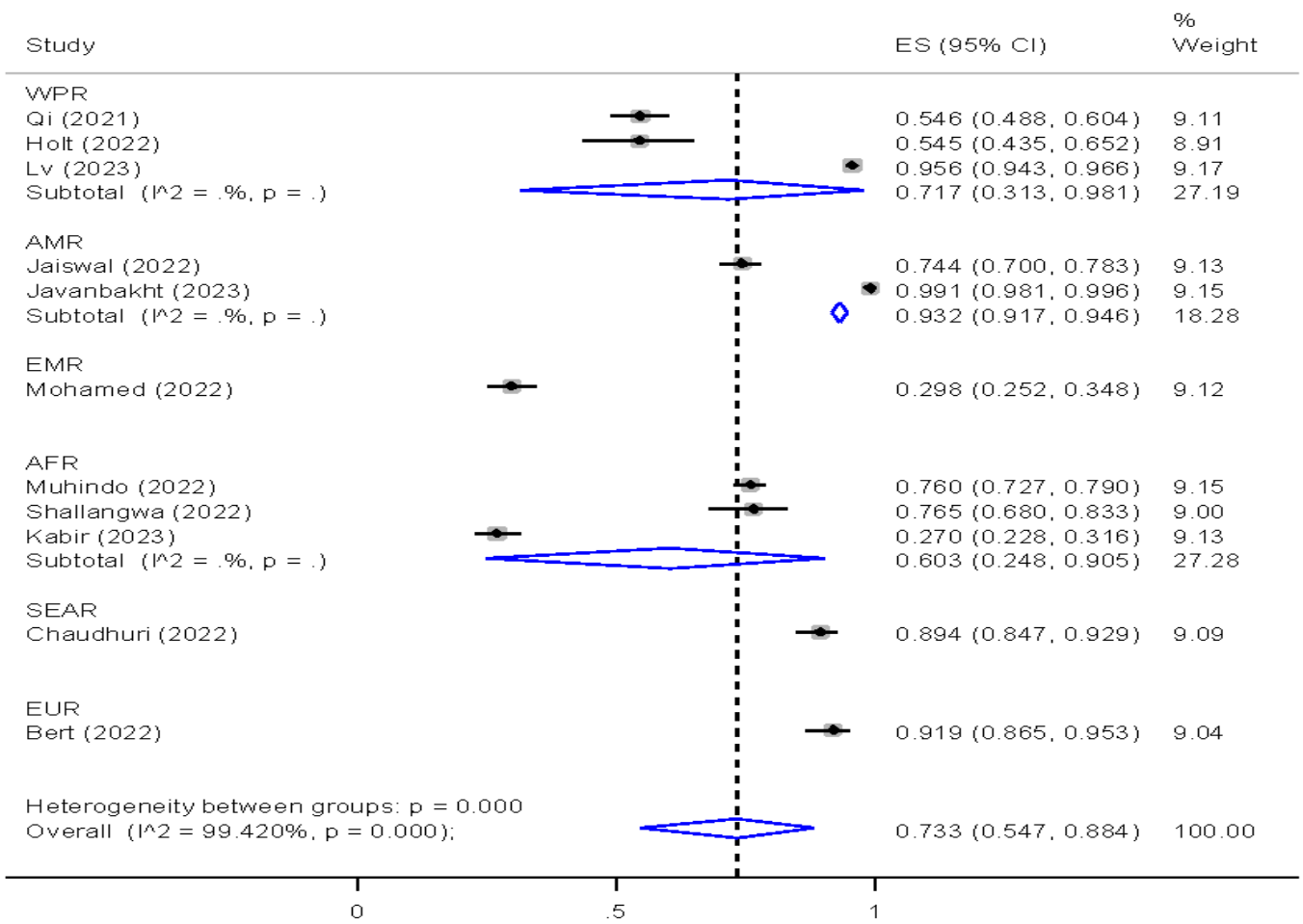


COVID-19 Vaccine Uptake Among PLHIV (By Study Year)

Supplementary Figure 34: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV according to the study year (n = 24 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

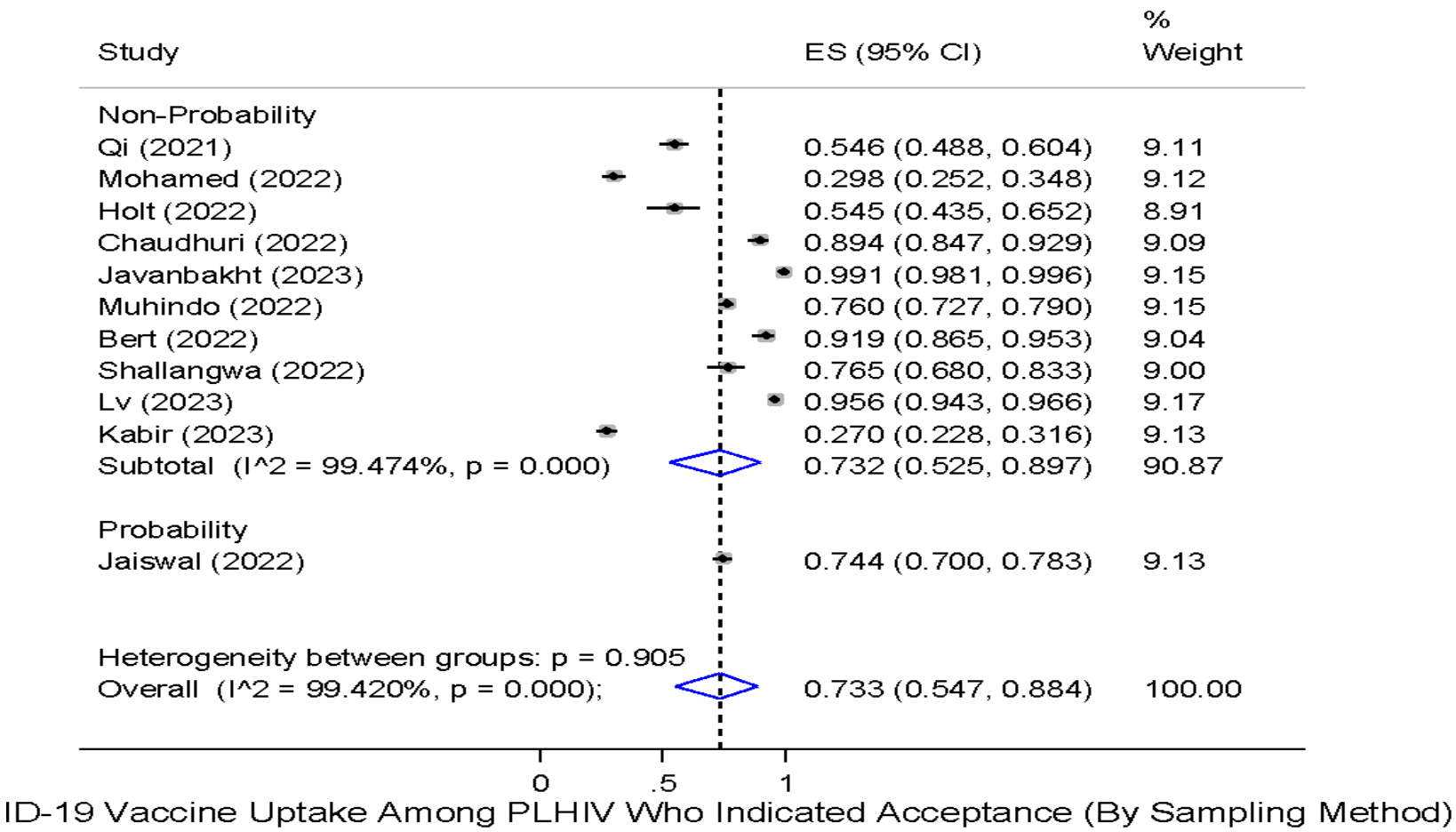


Supplementary Figure 35: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance globally (n = 11 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



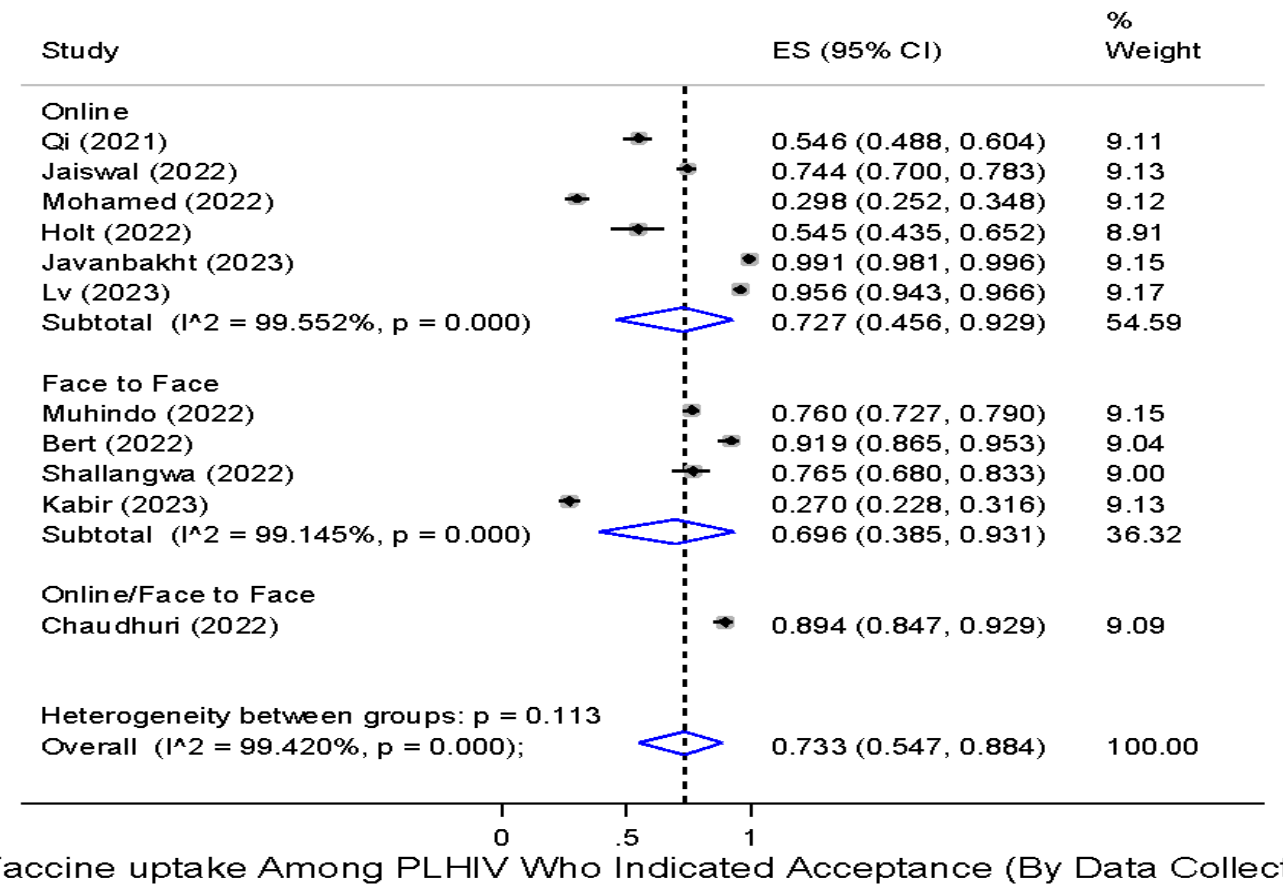
D-19 Vaccine uptake Among PLHIV Who Indicated Acceptance (By WHO Region)

Supplementary Figure 36: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the WHO region (n = 11 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

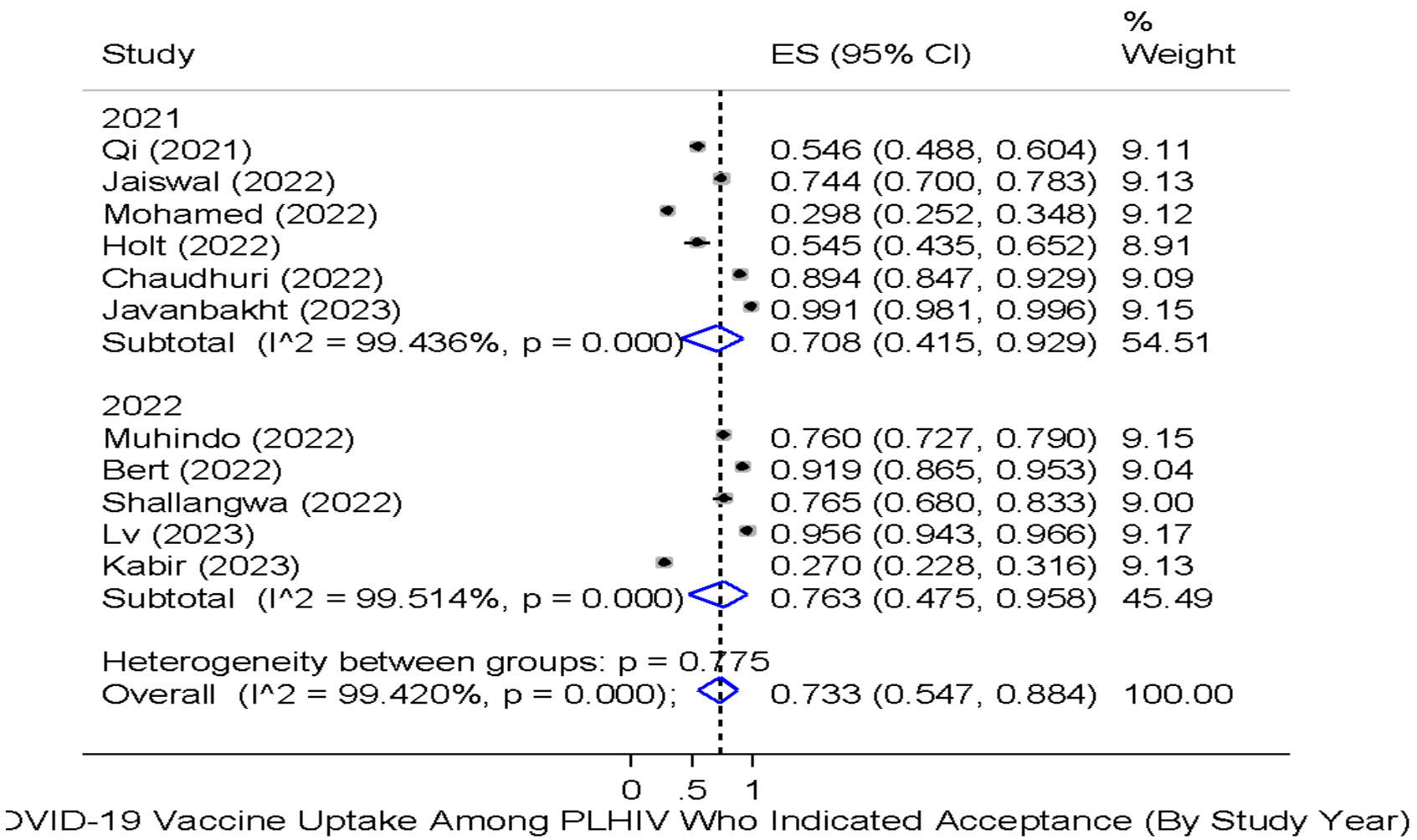


Supplementary Figure 37: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the sampling method employed (n = 11 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow

diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



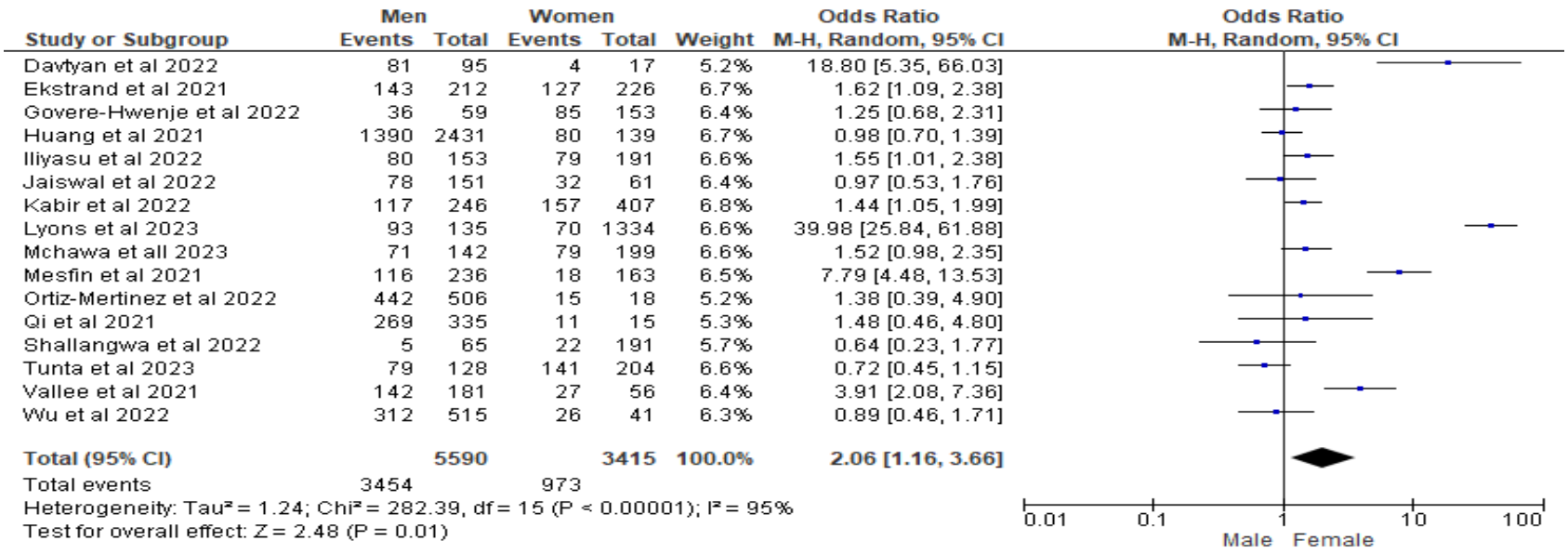
Supplementary Figure 38: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the data collection method (n = 11 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.



Supplementary Figure 39: Forest plots of the results of random-effects model meta-analysis of the prevalence (%) of COVID-19 vaccine uptake among PLHIV who indicated acceptance according to the study year (n = 11 studies) pooled using inverse variance weights. Each black-colored solid square represents the effect size of each characteristic, while the ends of the

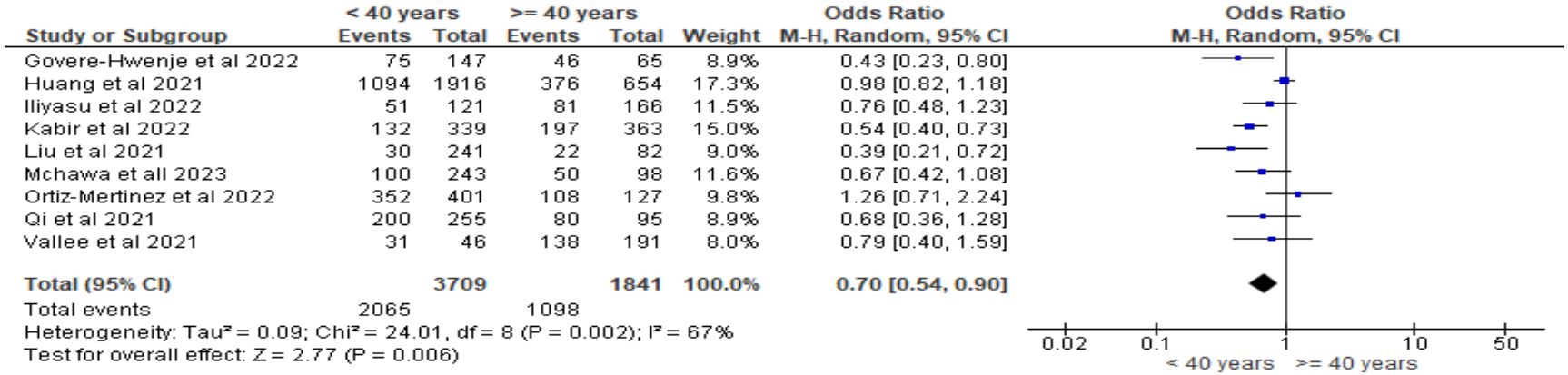
adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The blue-colored hollow diamond at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. ES, Effect Size.

SECTION D

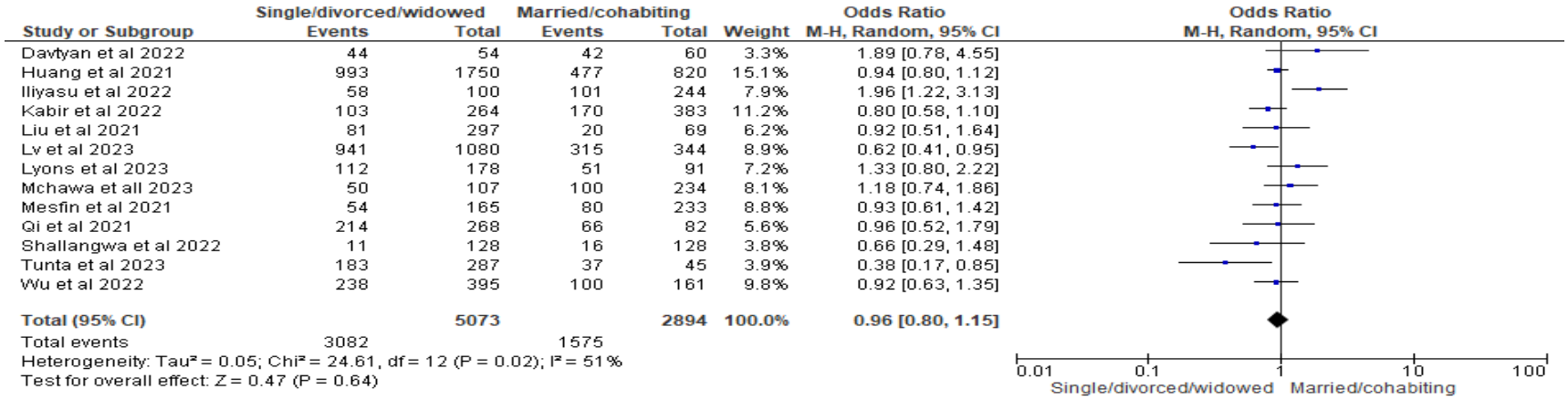


Supplementary Figure 40: Forest plots of random-effects model meta-analysis of gender as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 16 studies; N = 9,005 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent

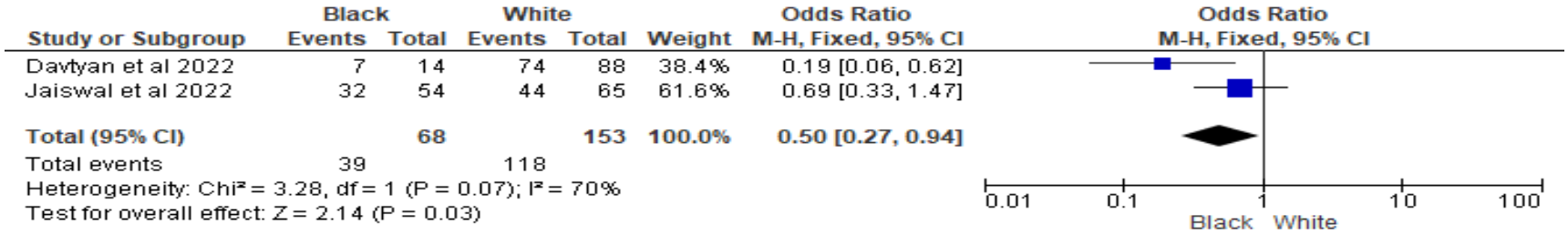
lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 41: Forest plots of random-effects model meta-analysis of age as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 9 studies; N = 5,550 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

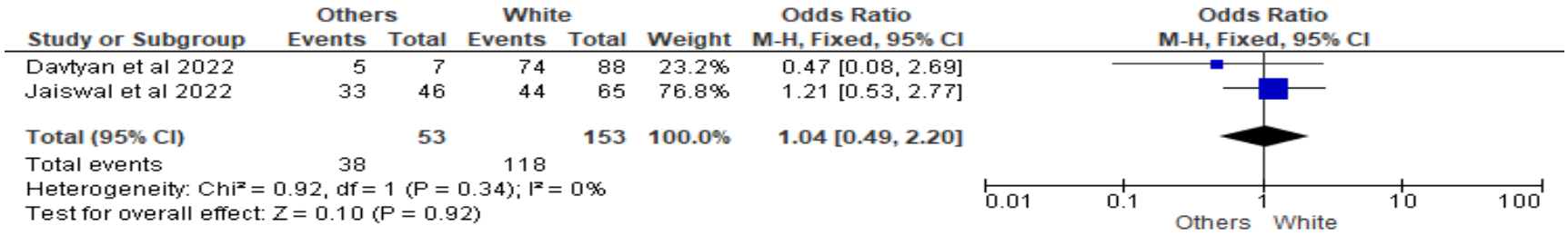


Supplementary Figure 42: Forest plots of random-effects model meta-analysis of marital status as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 13 studies; N = 7,967 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

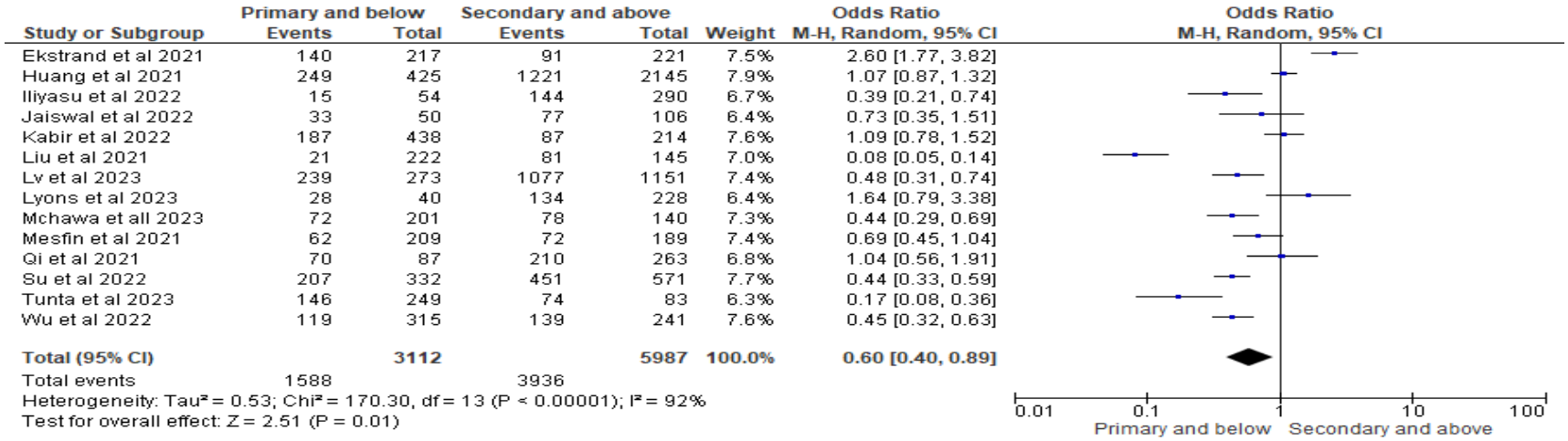


Supplementary Figure 43: Forest plots of fixed-effects model meta-analysis of race (Black vs. White) as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 2 studies; N = 221 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal

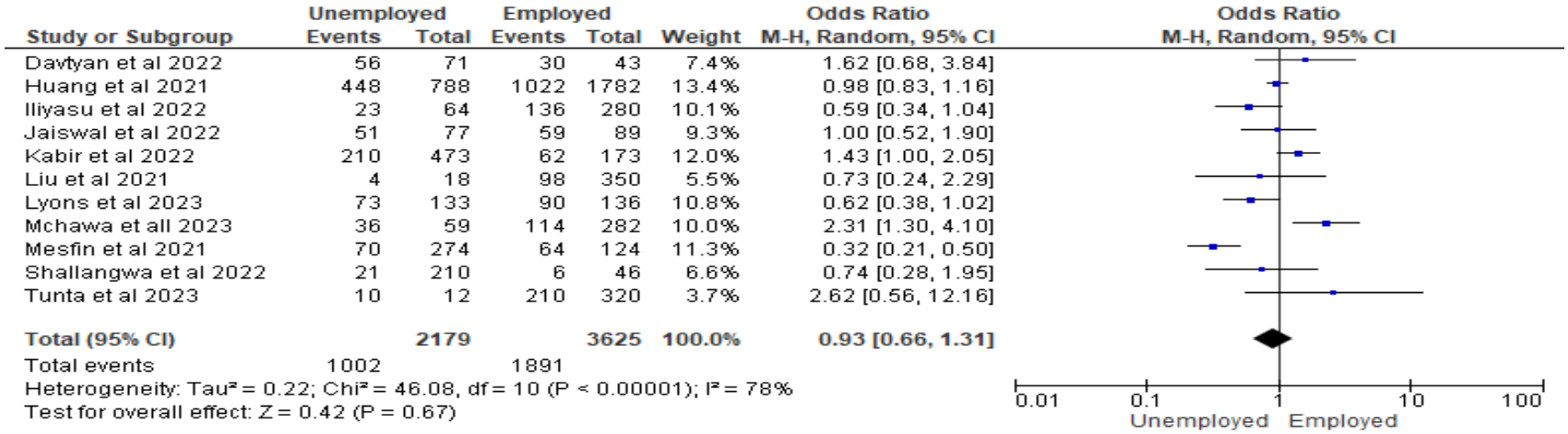
lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 44: Forest plots of fixed-effects model meta-analysis of race (Others [Latinx/Hispanic/Mixed race] vs. White people) as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 2 studies; N = 206 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

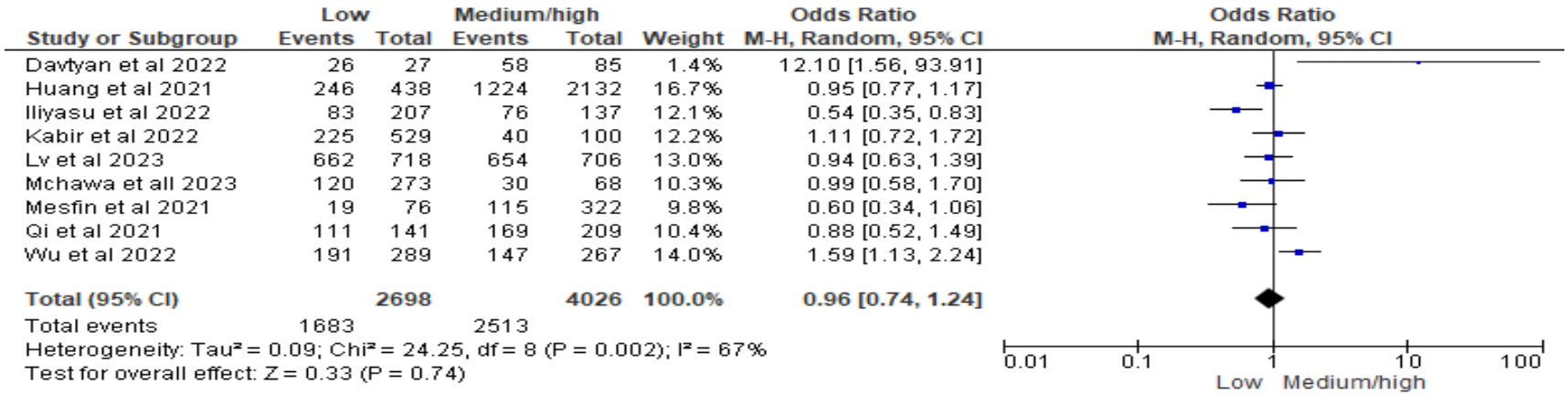


Supplementary Figure 45: Forest plots of random-effects model meta-analysis of educational level as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 14 studies; N = 9,099 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

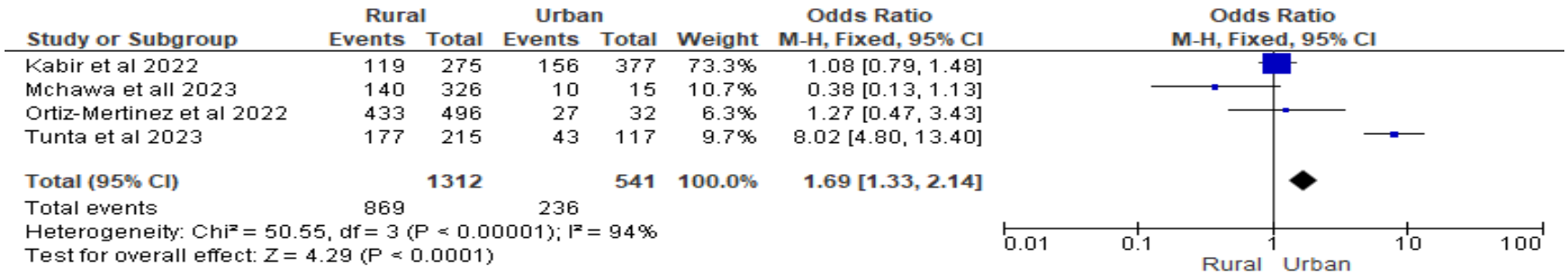


Supplementary Figure 46: Forest plots of random-effects model meta-analysis of employment status as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 11 studies; N = 5,804 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

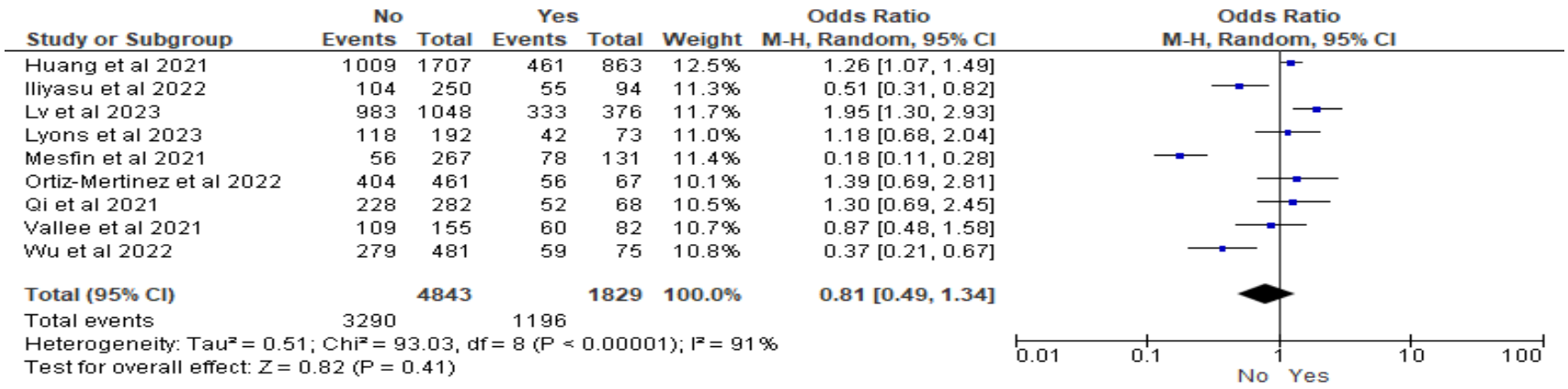
1. Income class



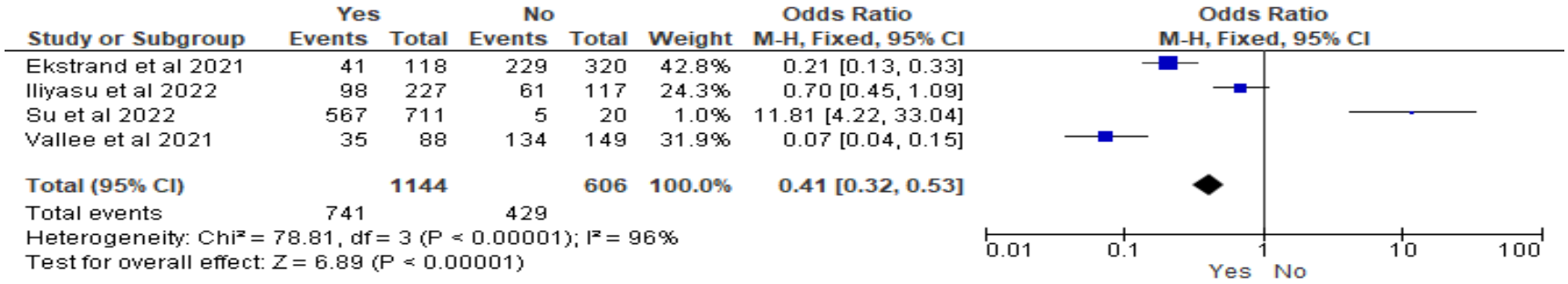
Supplementary Figure 47: Forest plots of random-effects model meta-analysis of income class as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 9 studies; N = 6,724 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



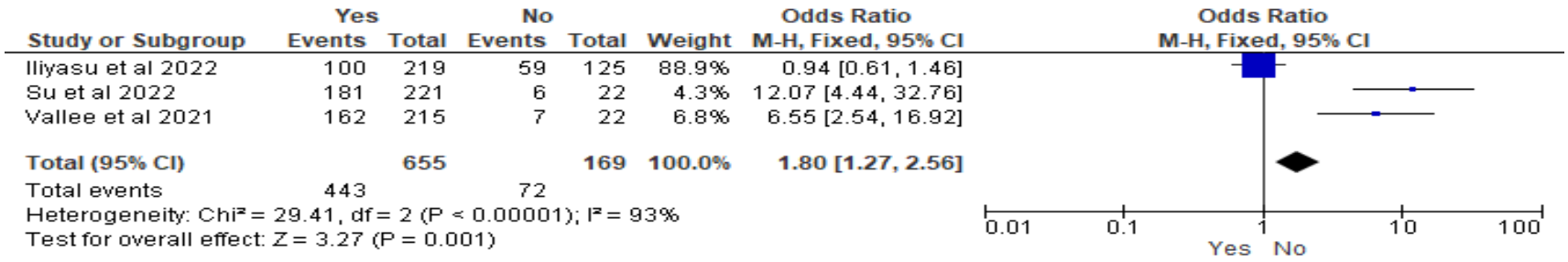
Supplementary Figure 48: Forest plots of fixed-effects model meta-analysis of residence as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 4 studies; N = 1,853 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



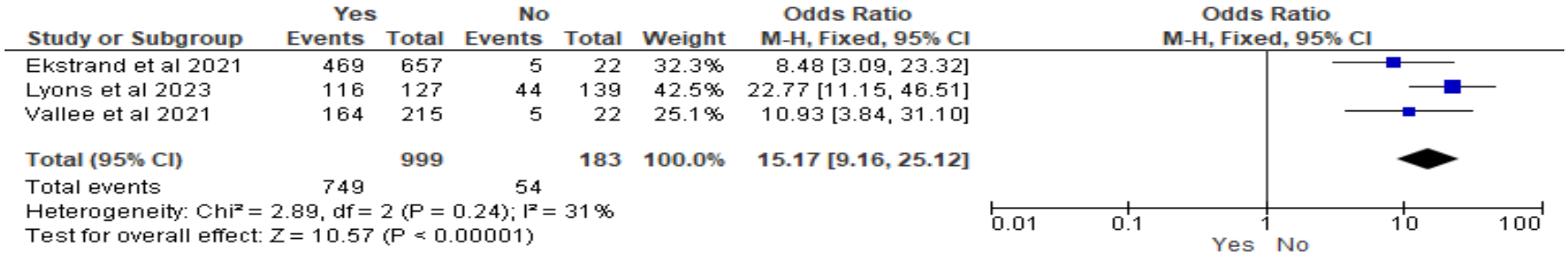
Supplementary Figure 49: Forest plots of random-effects model meta-analysis of comorbidity as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 9 studies; N = 6,672 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 50: Forest plots of fixed-effects model meta-analysis of concern about vaccine safety as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 4 studies; N = 1750 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

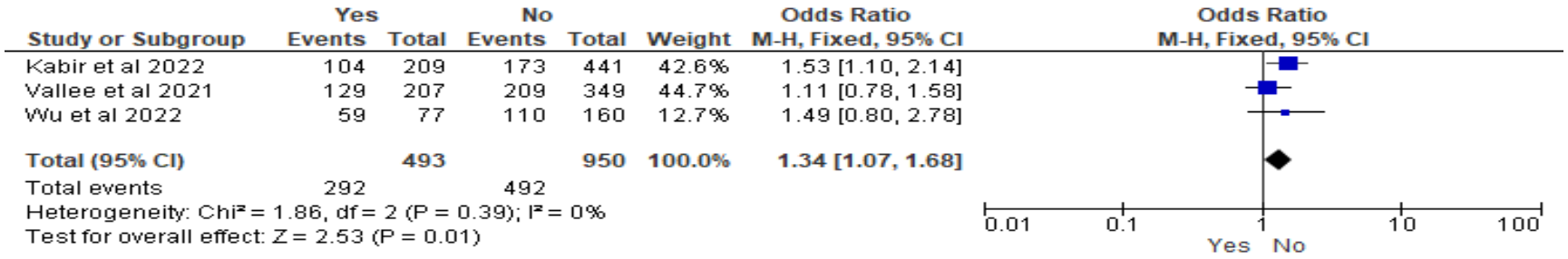


Supplementary Figure 51: Forest plots of fixed-effects model meta-analysis of perceived vaccine effectiveness as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 3 studies; N = 824 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

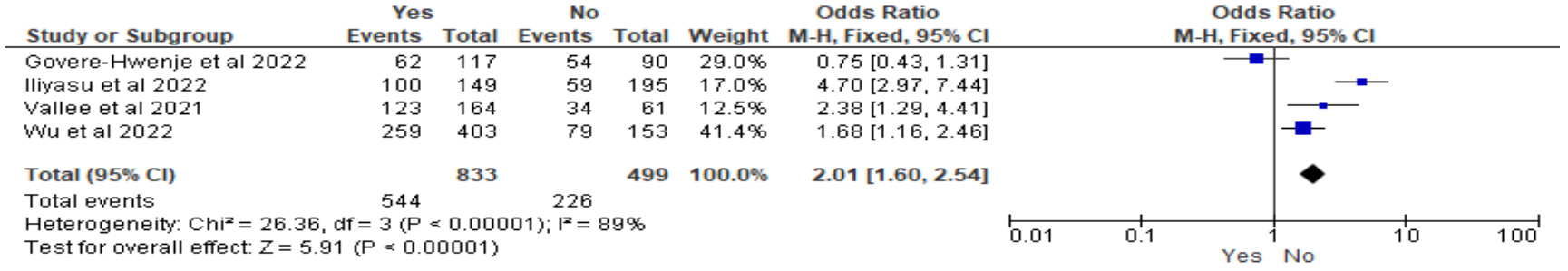


Supplementary Figure 52: Forest plots of fixed-effects model meta-analysis of vaccine trust as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 3 studies; N = 1,182 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

2. Perceived susceptibility



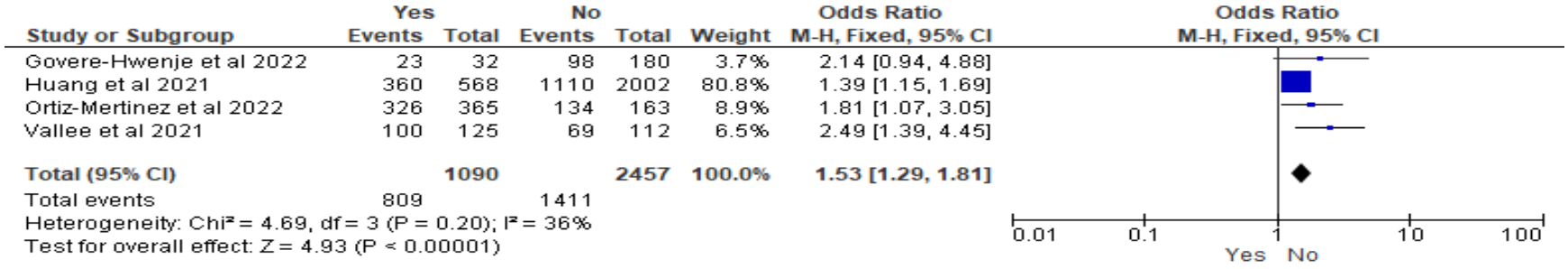
Supplementary Figure 53: Forest plots of fixed-effects model meta-analysis of perceived susceptibility to SARS-Cov-2 as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 3 studies; N = 1443 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



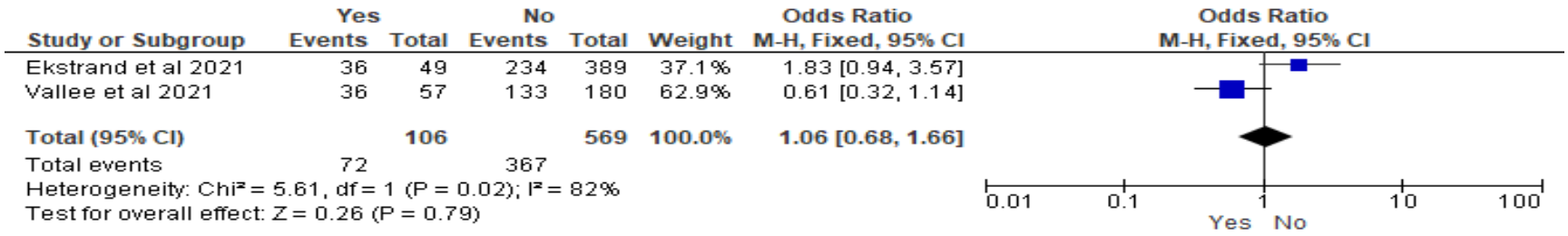
Supplementary Figure 54: Forest plots of random-effects model meta-analysis of fear of SARS-Cov-2 effect in PLHIV as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 4 studies; N = 1332 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of

the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

3. Receipt of influenza vaccination



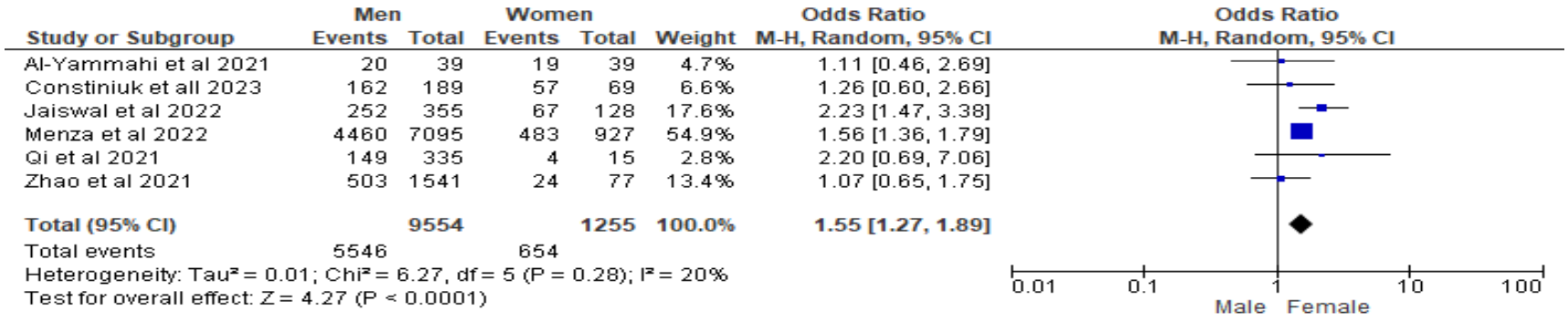
Supplementary Figure 55: Forest plots of random-effects model meta-analysis of recent influenza vaccination as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 4 studies; N = 3,547 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 56: Forest plots of random-effects model meta-analysis of knowing someone who died of COVID-19 as a determinant of COVID-19 vaccine acceptance pooled using the Mantel-Haenszel (M-H) method (n = 2 studies; N = 675 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

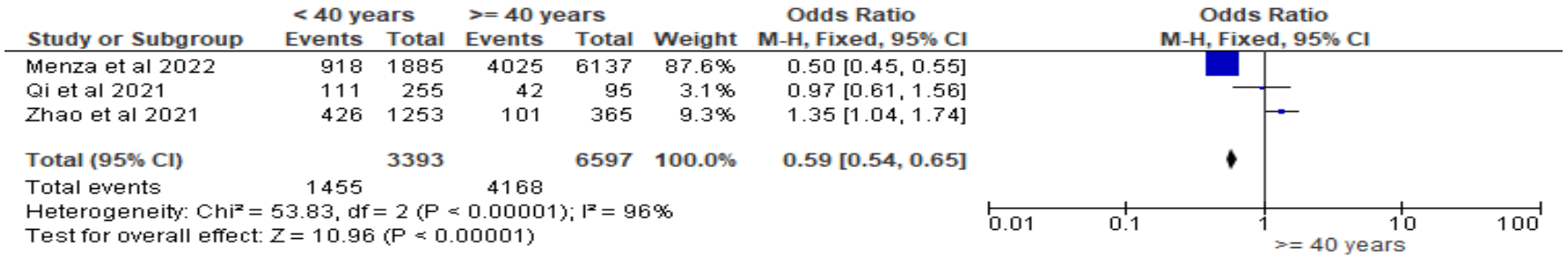
SECTION E

Results of the meta-analysis of the determinants of COVID-19 vaccine uptake in PLHIV



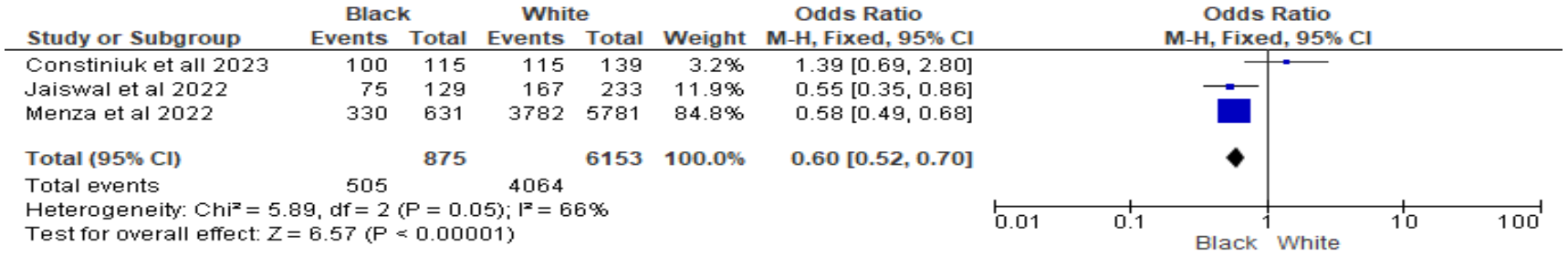
Supplementary Figure 57: Forest plots of random-effects model meta-analysis of gender as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 6 studies; N = 10,809 participants). Each blue-colored solid square

represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

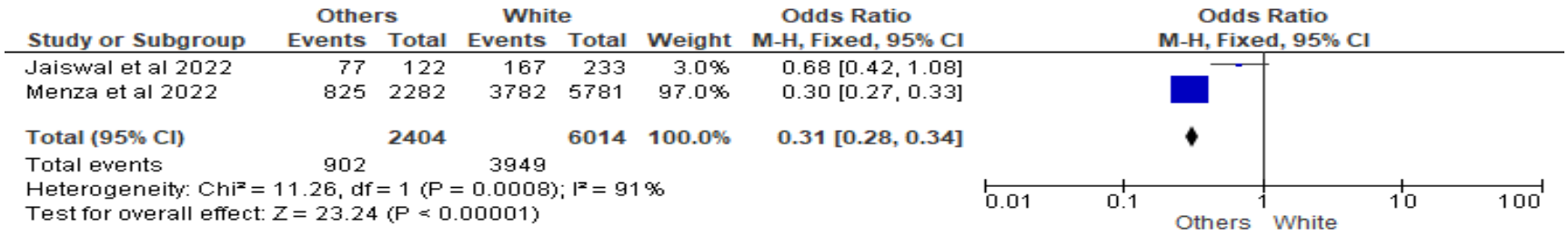


Supplementary Figure 58: Forest plots of fixed-effects model meta-analysis of age as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 3 studies; N = 9,990 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

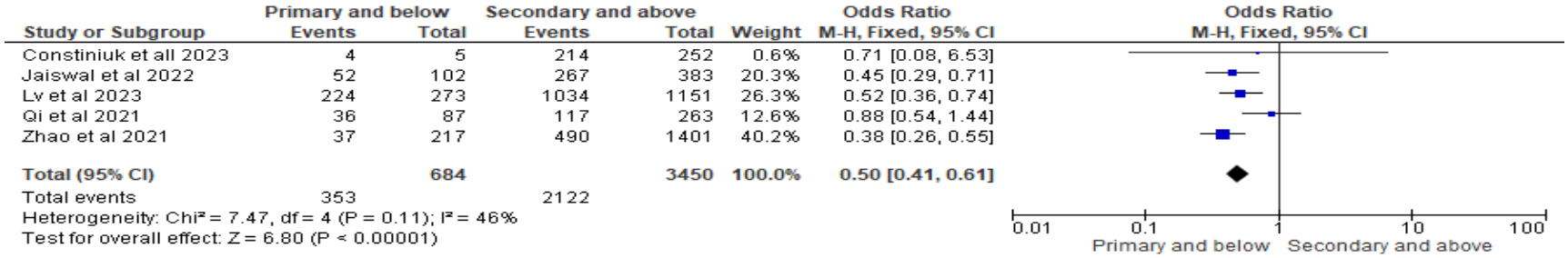
Supplementary Figure 59: Forest plots of fixed-effects model meta-analysis of marital status as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 2 studies; N = 1,968 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



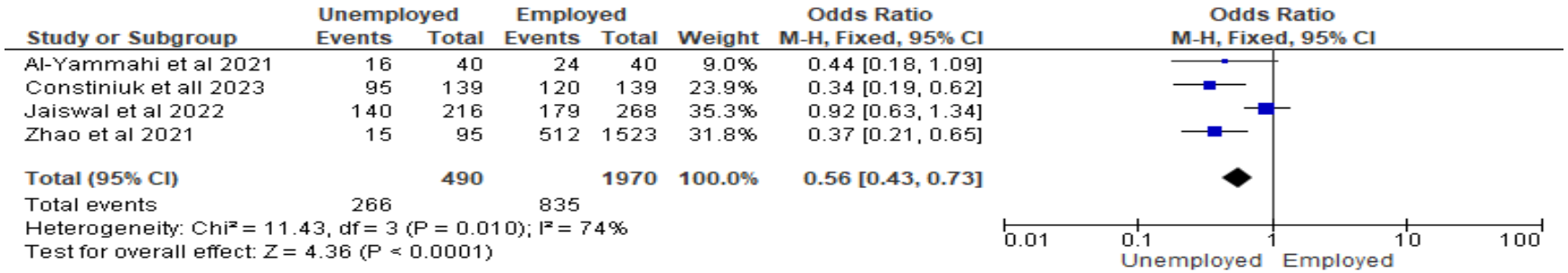
Supplementary Figure 60: Forest plots of fixed-effects model meta-analysis of race (Black vs. White) as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 3 studies; N = 7,028 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



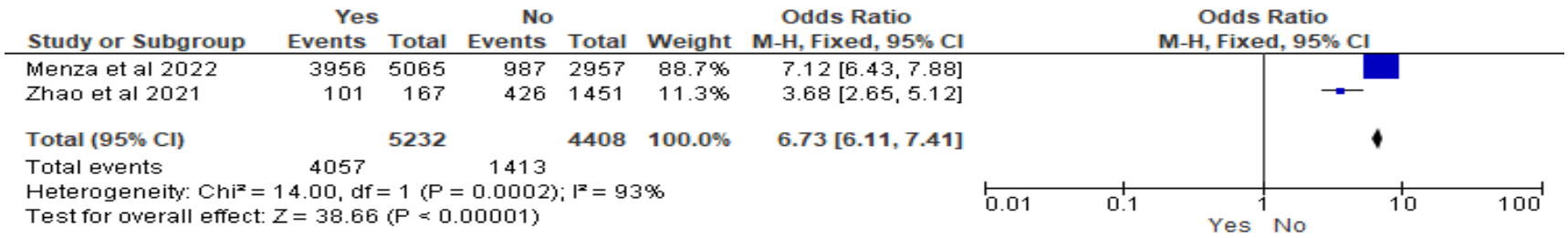
Supplementary Figure 61: Forest plots of fixed-effects model meta-analysis of Race (Others [Latinx/Hispanic/Mixed race] vs White people) as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 2 studies; N = 8,418 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 61: Forest plots of fixed-effects model meta-analysis of educational level as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 5 studies; N = 4,134 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 62: Forest plots of fixed-effects model meta-analysis of employment status as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 4 studies; N = 2,460 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.



Supplementary Figure 63: Forest plots of fixed-effects model meta-analysis of influenza vaccination as a determinant of COVID-19 vaccine uptake pooled using the Mantel-Haenszel (M-H) method (n = 2 studies; N = 9,640 participants). Each blue-colored solid square represents the effect size (odds ratio, OR) of each characteristic, while the ends of the adjoining horizontal lines represent lower (left) and upper (right) confidence intervals. The isolated black-colored solid rhombus at the bottom denotes the overall estimated effect size and the 95% CI. All statistics were based on a two-sided t-test. df: degree of freedom.

SECTION F

Table 2: The Preferred Reporting Item for Systematic Reviews and Meta-analysis (PRISMA) 2020 checklist of the present work

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a literature review.	1
ABSTRACT			
Abstract	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings. See the PRISMA 2020 for Abstracts checklist for the complete list.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge, i.e., what is already known about your topic.	2, 3
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses with study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for	21

Section and Topic	Item #	Checklist item	Location where item is reported
		eligibility, giving rationale.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	20
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	20
Selection process	8	State the process for selecting studies (i.e., screening, eligibility). Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	20,21
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	23
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	6, 7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	6
Study characteristics	17	Cite each included study and present its characteristics (e.g., study size, PICOS, follow-up period).	7 - 9
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	8,9
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	9 - 14

Section and Topic	Item #	Checklist item	Location where item is reported
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	14 - 19
	23b	Discuss any limitations of the evidence included in the review.	19
	23c	Discuss any limitations of the review processes used.	19
	23d	Discuss implications of the results for practice, policy, and future research.	20
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	21
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	20
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	21 to 25
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	26
Competing interests	26	Declare any competing interests of review authors.	26
Availability of data, code, and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	26

Reference source: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

SECTION G

Table 3. The literature search strategy used across all databases used

PUBMED Key concepts **Concept 1: COVID-19** ("COVID-19"[Mesh] OR "SARS-CoV-2"[Mesh] OR covid* OR coronavirus* OR 2019-ncov OR sars-cov-2 OR cov-19) **Concept 2: Vaccine** ("Vaccines"[Mesh] OR "COVID-19 Vaccines"[Mesh] OR vaccin* OR immuniz*) **Concept 3: Hesitancy, Uptake, Refusal, Acceptance** ("Vaccination Hesitancy"[Mesh] OR "Vaccination Refusal"[Mesh] OR hesitan* OR uptake OR accept* OR refus* OR declin* OR intension* OR intend* OR intent* OR willing*) **Concepts 4: Determinants** (determinant* OR factor* OR cause* OR predictor* OR "risk factor*") **Concept 5: PLHIV** **("HIV"[Mesh] OR** "people living with hiv" OR "patients living with hiv" OR plwh OR plwha OR plhiv) **Combination** **1 AND 2 AND (3OR 4) AND 5**
COCHRANE Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, APA PsycInfo, CINAHL – (covid* OR coronavirus* OR 2019-ncov OR sars-cov-2 OR cov-19) AND (vaccin* OR immuniz*) AND (hesitan* OR uptake OR

accept* OR refus* OR declin* OR determinant* OR factor* OR cause* OR predictor* OR "risk factor*" OR intension* OR intend* OR intent* OR willing*) AND ("people living with hiv" OR "patients living with hiv" OR plwh OR plwha OR plhiv)

SCOPUS

TITLE-ABS-KEY (covid* OR coronavirus* OR 2019-ncov OR sars-cov-2 OR cov-19) AND TITLE-ABS-KEY (vaccin* OR immuniz*) AND TITLE-ABS-KEY (hesitan* OR uptake OR accept* OR refus* OR declin* OR determinant* OR factor* OR cause* OR predictor* OR "risk factor*" OR intension* OR intend* OR intent* OR willing*) AND TITLE-ABS-KEY ("people living with hiv" OR "patients living with hiv" OR plwh OR plwha OR plhiv)

GOOGLE SCHOLAR

EMBASE

Concept 1:

("severe acute respiratory syndrome coronavirus 2*" OR ("SARS-CoV-2*" NEAR/3 "corona*") OR "coronavirus disease 2019*") OR "COVID-19*") OR "2019-ncov*")kw.

Concept 2:

("vaccin*" OR "vaccination*" OR "immunization*" OR "immunisation*" OR "vaccination hesitancy*" OR "reluctance*" OR "resistance*" OR "refusal*" OR "acceptance*" OR "willingness*" OR "behavi*" OR "uptake*" OR "coverage*" OR "barriers*" OR "factor*" OR "opinion*" OR "determinant*" OR respons* OR "predictor*" OR "intention*" OR "intention*" OR "decline*" OR "decision*")kw

Concept 3: 1 AND 2

WEB OF SCIENCE

Concept 1:

TI= ("(severe acute respiratory syndrome coronavirus 2*" OR ("SARS-CoV-2*" NEAR/3 "corona*") OR "coronavirus disease 2019*") OR "COVID-19*") OR "2019-ncov*") AB= ("severe acute respiratory syndrome coronavirus 2*" OR ("SARS-CoV-2*" NEAR/3 "corona *") OR "coronavirus disease 2019*") OR "COVID-19*") OR "2019-ncov*") OR AK= ("severe acute respiratory

syndrome coronavirus 2*" OR ("SARS-CoV-2*" NEAR/3 "corona *") OR "coronavirus disease 2019*") OR "COVID-19*") OR "2019-ncov*").

Concept 2:

TI=("vaccin*" OR "vaccination*" OR "immunization*" OR "immunisation*" OR "vaccination hesitancy*" OR "reluctance*" OR "resistance*" OR "refusal*" OR "acceptance*" OR "willingness*" OR "behavi*" OR "uptake*" OR "coverage*" OR "barriers*" OR "factor*" OR "opinion*" OR "determinant*" OR respons* OR "predictor*" OR "intention*" OR "intention*" OR "decline*" OR "decision*") OR AB= ("vaccin*" OR "vaccination*" OR "immunization*" OR "immunisation*" OR "vaccination hesitancy*" OR "reluctance*" OR "resistance*" OR "refusal*" OR "acceptance*" OR "willingness*" OR "behavi*" OR "uptake*" OR "coverage*" OR "barriers*" OR "factor*" OR "opinion*" OR "determinant*" OR respons* OR "predictor*" OR "intention*" OR "intention*" OR "decline*" OR "decision*") OR AK= =("vaccin*" OR "vaccination*" OR "immunization*" OR "immunisation*" OR "vaccination hesitancy*" OR "reluctance*" OR "resistance*" OR "refusal*" OR "acceptance*" OR "willingness*" OR "behavi*" OR "uptake*" OR "coverage*" OR "barriers*" OR "factor*" OR "opinion*" OR "determinant*" OR respons* OR "predictor*" OR "intention*" OR "intention*" OR "decline*" OR "decision*")

Concept 3:

T1= ("HIV*" OR "people living with hiv*" OR "patients living with hiv*" OR "plwh*" OR "plwha*" OR "plhiv*") OR AB= ("HIV*" OR "people living with hiv*" OR "patients living with hiv*" OR "plwh*" OR "plwha*" OR "plhiv*") OR AK= ("HIV*" OR "people living with hiv*" OR "patients living with hiv*" OR "plwh*" OR "plwha*" OR "plhiv*")

Concept 4: 1 AND 2 AND 3

SECTION H

Quality assessment (critical appraisal) of all the included studies

Table 4. Risk of bias for included cross-sectional studies in the systematic review.

Author Reference	**Was the sample frame appropriate to address the target population?**	**Were study participants sampled in an appropriate way?**	**Was the sample size adequate?**	**Were the study subjects and the setting described in detail?**	**Was the data analysis conducted with sufficient coverage of the identified sample?**	**Were valid methods used for the identification of the condition?**	**Was the condition measured in a standard, reliable way for all participants?**	**Was there appropriate statistical analysis?**	**Was the response rate adequate, and if not, was the low response rate managed appropriately?**	**Total (%)**	**Quality level (High >50%, low <50%)**
Qi et al	1	1	1	1	1	1	1	1	NC	88.89	High
Liu	1	1	1	1	1	NC	1	1	1	88.89	High
Yang	1	1	1	1	1	1	1	1	1	100	High
Wu et al	1	1	1	1	1	NA	1	1	1	88.90	High
Vallée et al	1	1	1	0	1	NA		1	0	66.70	High
Shrestha et al	1	1	1	1	1	1	1	1	1	100	High
Menza et al	1	1	1	1	1	NA	1	1	1	88.90	High

O'Regan et al	1	0	0	1	1	NA	1	1	NC	55.56	High
Davtyan et al	1	1	1	1	1	NA	1	1	NC	77.78	High
Mesfin et al	1	1	1	1	1	1	1	1	1	100	High
Kaida et al	1	1		1	1	1	1	1	1	100	High
Su et al	1	1	1	1	1	1	1	1	1	100	High
Megan et al	1	1	1	0	1	0	1	1	1	77.78	High
Iliyasu et al	1	1	1	1	1	1	1	1	1	100	High
Chai et al	1	1	1	1	1	1	1	1	1	100	High
Jaiswa et al	1	1	1	1	1	1	1	1	NC	88.89	High
Jones et al	1	1	1	1	1	1	1	1	1	100	High
Zhao et al	1	1	1	1	1	NC	1	1	1	88.89	High
Zheng et al	1	1	1	1	1	1	1	1	1	100	High
Govere-Hwenje et al	1	1	NC	1	1	1	1	1	1	88.89	High
Huang et al	1	1	1	1	1	1	1	1	1	100	High

Ortiz-Mart´ınez et al	1	1	1	1	1	1	1	1	NC	88.89	High
Fulda et al	1	1	1	0	1	1	1	1	1	88.89	High
Mohammed et al	1	1	1	1	1	1	1	1	1	100	High
Kabir et al	1	1	1	1	1	1	1	1	1	100%	High
Donohue et al	1	1	0	0	1	1	1	1	0	66.67%	High
Holt et al	1	1	1	1	1	1	1	1	1	100%	High
Muhindo et al	1	1	1	1	1	1	1	1	1	100%	High
Swendeman et al	1	1	1	1	1	1	1	1	1	100%	High
Wickersham et al	1	1	1	0	1	1	1	1	1	88.89%	High
Prestage	1	1	1	1	1	1	1	1	1	100%	High
Folayan et al	1	1	1	1	1	1	1	1	1	100%	High
Bogart et al	1	1	0	1	1	1	1	1	1	88.89%	High
Lyons et al	1	1	NC	1	1	1	1	1	NC	77.78%	High

Madzima et al	1	1	1	1	1	1	1	1	1	100%	High
Chaudhuri et al	1	1	1	1	1	1	1	1	1	100%	High
Prestage	1	1	1	1	1	1	1	1	1	100%	High
Siewe Fodjo et al	1	1	1	1	1	1	1	1	NC	88.89%	High
Bert et al	1	1	NC	0	1	1	1	1	NC	66.67%	High
Shallangwa et al	1	1	1	1	1	1	1	1	1	100%	High
Costiniuk et al	1	1	1	1	1	1	1	1	1	100	High
Cummings et al	1	1	1	1	1	1	1	1	1	100	High
Singh et al	1	1	1	1	1	1	0	1	1	88.89	High
Berhie	1	1	0	0	1	0	1	1	1	66.67	High
LV et al	1	1	1	1	1	1	1	1	1	100	High
Sun	1	1	1	0	1	1	1	1	NC	77.78	High
Mchawa et al	1	1	1	1	1	1	1	1	1	100	High

Tunta et al	1	1	1	1	1	1	1	1	1	100	High
Wicaksana et al	1	1	1	1	1	1	1	1	1	100	High

Table 5. Risk of bias for included cohort studies in the systematic review.

Author Reference	**Were the two groups similar and recruited from the same population?**	**Were the exposures measured similarly to assign people to both exposed and unexposed groups?**	**Was the exposure measured in a valid and reliable way?**	**Were confounding factors identified?**	**Were strategies to deal with confounding factors stated?**	**Were the groups/ participants free of the outcome at the start of the study (or at the moment of exposure)?**	**Were the outcomes measured in a valid and reliable way?**	**Was the follow up time reported and sufficient to be long enough for outcomes to occur?**	**Was follow up complete, and if not, were the reasons to loss to follow up described and explored?**	**Were strategies to address incomplete follow-up utilized?**	**Total (%)**	**Quality level (High >50%, low <50%)**
Baker et al	1	1	1	1	0	0	1	1	1	0	70	High

Hechter et al												
Rosenthal et al	1	1	1	1	NC	1	1	1	1	NA	80	High
Strathdee et al	1	1	1	1	1	1	1	1	1	1	100	High
Javanbakht et al	1	1	1	1	1	1	1	1	1	NC	90	High