Interventions of eHealth technologies integrated with non-physician health workers for improving management of hypertension: Systematic review and meta-analysis

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pressure					27

Supplementary Table S1: Search Strategy

1	community health workers.mp. or exp health auxiliary/
2	community health nursing/ or nurse/
	((Community adj3 health adj3 worker*) or CHW* or extension worker* or
	health extension worker* or outreach worker or outreach worker* or village
	health worker* or community health-care worker* or allied health worker* or
	lay health worker or lay health worker* or lay health-care worker* or (lay
	adj3 health adj3 volunteer*) or (lay adj3 healthcare adj3 volunteer*) or
	Primary health care worker* or primary healthcare worker* or primary
	health-care worker* or community worker* or community health care
	worker* or community healthcare worker* or bare foot health care worker* or
	barefoot doctor* or community health practitioner* or community health
	volunteer or community health volunteer* or health volunteer or (health adj3
	volunteer*) or (community adj3 health adj3 volunteer*) or Female
	Community Health Volunteer* or FCHV or Accredited Social Health
3	Activist* or ASHA or aganwadi* or agents communitaria de saude or agents
	communitaria de salud or embajadoras or colaborador voluntary schema or
	colaborador voluntary* or family welfare assistant* or Consejera or lay
	volunteer* or "care worker*" or health promotor* or community health
	provider* or emergency medical technician* or home health aides or trained
	personnel or "community resource person*" or health promotor* or frontline
	health worker* or promotora* or volunteer health worker* or "community
	health agent*" or community health surveyor* or community health assistant*
	or community health promoter*OR village health volunteer or close-to-
	community provider*vOR community-based practitioner*vOR lady Health
	worker* or Community Practitioner* or promotoras de salud or Animatrice or
	Barangay health worker or Barangay health workers or Basic health worker or
	Basic health workers or Brigadista or Colaborador voluntario* or Community

	health agent* or rural health auxiliaries or rural health auxiliary or
	Community health representative* or Female multipurpose health worker* or
	Kader or Monitora or Mother coordinator or Outreach educator* or Health
	Surveillance Assistant* or Nutrition Counselor* or Peer Educator* or
	Shasthya Shebika or Socorrista or Animator* or Community Case
	Management Worker* or Community Health Extension Worker* or Village
	health helper* or Village drug-kit manager* or Accompagnateur or Care
	Group Volunteer* or Community Case Management Worker or Community
	Case Management Worker* or auxiliary nurse-midwives or Auxiliary Nurse-
	midwife or Family Health Worker* or Care Group Volunteer* or Health
	Surveillance Assistant* or Family Planning Agent* or Family Welfare
	Assistant* or Family Welfare Assistant* or Maternal Child Health Worker*
	or Mobile Clinic Team* or Nutrition Agent* or Community HealthCare
	Provider*).mp. [mp=title, abstract, heading word, drug trade name, original
	title, device manufacturer, drug manufacturer, device trade name, keyword
	heading word, floating subheading word, candidate term word]
	((licensed practical nurse* adj5 community) or nursing assistant* or
	community nurse or community nurse* or (community adj5 nurse) or
	community health nurse* or (community adj5 heath adj5 nurse*) or
	(community health adj5 nurse) or primary health care nurse* or (primary
	health care adj5 nurse) or (pharmacy technician* adj3 community) or health
4	auxiliary or ANM or auxiliary nurse midwi* or midwi* or auxiliary midwives
	or community pharmacist or (community adj3 pharmacist*) or community
	drug distributor* or (non-physician health worker* adj5 community) or (non-
	physician adj5 community) or (non-physician adj5 community) or (health
	care workforce adj5 community) or (health workforce adj5 community) or
	(health care worker* adj5 community) or (extended scope practice adj5
	community) or (healthcare provider* adj3 community)).mp.
5	exp Hypertension/di, ep, pc [Diagnosis, Epidemiology, Prevention & Control]

	(Hypertension or hypertens\$ or blood pressure or bloodpressure or BP or
6	raised blood pressure or high blood pressure or pre hypertens* or pre-
	hypertens* or raised blood pressure).mp.
7	exp non communicable disease/di, dm, ep, pc [Diagnosis, Disease
/	Management, Epidemiology, Prevention]
	(Noncommunicable diseases or chronic disease or non-communicable disease
	or noncommunicable disease or NCD).mp. [mp=title, abstract, heading word,
8	drug trade name, original title, device manufacturer, drug manufacturer,
	device trade name, keyword heading word, floating subheading word,
	candidate term word]
	(mobile Health or digital health or telemedicine or telehealth or technology
	enabled or eHealth or mHealth or SMS or messaging).mp. [mp=title, abstract,
9	heading word, drug trade name, original title, device manufacturer, drug
	manufacturer, device trade name, keyword heading word, floating subheading
	word, candidate term word]
10	1 or 2 or 3 or 4
11	5 or 6 or 7 or 8
12	9 and 10 and 11

				Samp	le						
	A 41			size				Durati		Type of	
S.	Aution	Publishe	Countr			Age	Population/disease	on of	Type of Intervention	eHealth	Type of non-
Ν	and	d year	У	Inter	Со	(years	condition	follow-	Type of Intervention	technolo	physician
	reference			venti	ntr)		up		gy	
				on	ol						
							At least 2 metabolic				
							abnormalities:waist				
							circumference (male:				
							≥90 cm; female: ≥80				
							cm), blood pressure				
							(systolic: ≥135 mmHg;				
							diastolic: ≥85 mmHg),				
							triglyceride ≥150				Certified
							mg/dL, high-density				exercise
							lipoprotein (HDL)		App-based self-logging and		regimen
							cholesterol (male: <40		personalized coaching from	Mobile	coordinators
	Cho et al,		South				mg/dL; female: <50	6	professional dieticians and	applicati	and clinical
1	2020	2020	Korea	43	41	30-59	mg/dL), and fasting	months	exercise coordinators group	on	dieticians

Supplementary Table S2: Characteristics of the included studies

				Samp	le						
	Author			size		Age		Durati		Type of	
S.	and	Publishe	Countr		T	(years	Population/disease	on of	n of Type of Intervention	eHealth	Type of non-
Ν	reference	d year	У	Inter	Co		condition	follow-		technolo	physician
	reference			venti	ntr)		up		gy	
				on	ol						
							glucose level ≥100				
							mg/dL				
									Home BP monitor, scale, and		
									dietitian team care. Follow-up		
							BMI>26,		occurred via secure messaging to		
							elevated BP, and 10%-		report BP, weight, and fruit and		
	Green et						25% 10-year	6	vegetable intake and receive	Web-	
2	al, 2014	2014	USA	51	50	30-69	Framingham CVD risk	months	ongoing feedback.	based	Dieticians
							those with uncontrolled		Six individual weekly education		
							blood pressure, who		and consultation sessions		
							were taking		provided by a nurse in the first 6	Mobile	
	Ma et al,				10		antihypertensive	3	weeks and a researcher-developed	applicati	
3	2022	2022	China	105	5	26-73	medications,	months	smartphone application	on	Nurses
	Margolis,				16		adult patients with	12	Telehealth care using best	Telemon	Clinical
4	et al 2022	2022	USA	1423	48	18-85	moderately severe	months	practices and adding home BP	itoring	pharmacist

				Samp	le						
	Author			size		Age		Durati		Type of	
S.	and	Publishe	Countr			(vears	Population/disease	on of	Type of Intervention	eHealth	Type of non-
Ν	reference	d year	У	Inter	Co		condition	follow-		technolo	physician
				venti	ntr	,		up		gy	
				on	ol						
							hypertension		telemonitoring coordinated by a		
							(BP≥150/95 mm Hg):		clinical pharmacist		
						Mean					
						age					
						for					
						interv					
						ention					
						=69.9					
						Mean					
						age				Telephon	
						for				e-based	
	Ogren et				34	contro	Patients with stroke or	36	Telephone-based follow-up and	counselli	
5	al, 2018	2018	Sweden	320	0	l=69.3	TIA	months	counselling by nurses	ng	Nurse
	Persell et				25		Systolic blood pressure	12	Electronic health record-based	Electroni	
6	al , 2018	2018	USA	278	4	18+	of at least 135 mmHg	months	medication management tools	c health	Nurse

				Samp	le							
	Author			size		Age		Durati		Type of		
S.	and	Publishe	Countr			(vears	Population/disease	on of	on of Type of Intervention	eHealth	Type of non-	
Ν	reference	d year	У	Inter	Inter Co		condition	follow-	- J F	technolo	physician	
	renerence			venti	ntr)		up		gy		
				on	ol							
							or diastolic blood		(medication review sheets at visit	record		
							pressure of at least 85		check-in, lay medicationnurse-led	tools		
							mmHg or 130 mmHg		medication management support			
							or 80 mmHg for those		(EHR plus education group),			
							with diabetes		information sheets printed after			
										visits and		
									Patients in the IG received a Blue-			
									toothed UA-767Plus BT Blue-			
									toothed BP device and			
									smartphone with an App for			
							Confirmed stroke of <1		monitoring BP measurements and			
							month and uncontrolled		medication	Mobile		
	Sarfo et						hypertension	9	intake under nurse guidance for	applicati		
7	al , 2018	2018	Ghana	30	30	18+	$(SBP \ge 140 \text{ mmHg})$	months	three month	on	Nurse	

				Samp	le						
S.	Author	Publishe	Countr	size r		Age	Population/disease	Durati on of	True of Intervention	Type of eHealth	Type of non-
Ν	reference	d year	у	Inter venti on	Co ntr ol)	condition	follow- up	Type of Intervention	technolo gy	physician
									An mHealth smartphone app and		
									a nurse case management model		
							Chronic pain,		in partnership with a health-social	Mobile	
	Wong et		Hong				hypertension, or	3	care team composed of social	applicati	
8	al, 2022	2022	Kong	74	76	60 +	diabetes.	months	workers and general practitioners	on	Nurse
									Participants were instructed to		
									download and use the 4-free apps		
									to facilitate the self-monitoring		
									and detect BP and behavior	Mobile	
	Alsaqer et						Diagnosed with	3	changes and public health nursing	applicati	
9	al, 2022	2022	Jordan	37	37	55+	hypertension	months	intervention	on	Nurse
									Community health worker-led		
									home intervention (health		Community
	He et al,		Argenti		68		Uncontrolled	18	coaching, home BP monitoring,	SMS text	health
10	2017	2017	na	743	9		hypertension	months	and BP audit and feedback), a	messages	workers

				Samp	le						
S.	Author	Publishe	Countr	size		Age	Population/disease	Durati on of	Tune of Intervention	Type of eHealth	Type of non-
Ν	reference	d year	У	Inter venti on	Co ntr ol)	condition	follow- up	Type of fintervention	technolo gy	physician
									physician intervention, and a text-		
									messaging intervention		
									teractive physician educational		
									programs		
									In-person health education along		
									with a health education booklet		
									and SMS text messaging to		
									develop awareness and		Community
	Jahan et		Bangla		21			5	knowledge, and motivate behavior	SMS text	health
11	al , 2020	2020	desh	209	1	> 35	Hypertension	months	changes	messages	workers
							Self-reported history of			Electroni	
							(1) coronary heart		Two therapeutic lifestyle	с	
			China				disease, (2) stroke, (3)		modifications (smoking cessation	decision	Community
	Tain et al,		and		99		diabetes mellitus,	12	and salt reduction) and the	support	health
12	2015	2015	India	1095	1	≥40	and/or (4) measured	months	appropriate prescription of two	system	workers

				Samp	le						
	Author	Publishe d year		size		Age		Durati		Type of	
S.	S. and		Countr		1	(years	Population/disease condition	on of	Type of Intervention	eHealth	Type of non-
Ν	reference		У	Inter	Co			follow-		technolo	physician
				venti	ntr	,		up		gy	
				on	ol						
							systolic blood pressure		medications (blood pressure-		
							(SBP) ≥160 mm Hg		lowering agents and aspirin. The		
									management program was		
									delivered by		
									trained community health workers		
									in the intervention group on a		
									monthly basis with the assistance		
									of electronic decision support		
									system in the form of an Android-		
									based app installed on		
									smartphones		
									(1) CHW-participant telehealth		
									communication via mobile health		Community
	Vuaghan						Type 2	12	(mHealth) for 12 months, (2)	Telehealt	health
13	et al, 2021	2021	USA	44	45	>18	diabetes.	months	CHW-led monthly group visits for	h support	workers

				Samp	Sample size Age Durati						
	Author and	Publishe d year		size				Durati		Type of	
S.			Countr	ountr		(years	Population/disease	on of	Type of Intervention	eHealth	Type of non-
Ν	reference		У	Inter	Co		condition	follow-		technolo	physician
				venti	ntr	,		up		gy	
				on	ol						
									6 months, and (3) weekly CHW-		
									physician diabetes training and		
									support via telehealth (video		
									conferencing).		
									The first component comprised		
									personal consultations by trained		
									pharmacy students. The second		
	Zhai et al,				19		diagnosed with	3	component was SMS text	SMS text	
14	2020	2020	China	192	2	>18	hypertension	months	messages sent at 3-day intervals	messages	Pharmacist
									The active SMS which included		
									information on the management		
									of hypertension as well as advice		Community
	Tobe et al,						Those with	12	to follow-up with the participant's	SMS text	health
15	2018	2018	Canada	64	58	>18	hypertension	months	health care provider if the	messages	workers

				Sample							
	Author and			size	size Age			Durati		Type of	
S.		Publishe	Countr			(vears	Population/disease	on of	Type of Intervention	eHealth	Type of non-
Ν	reference	d year	У	Inter	Co		condition	follow-		technolo	physician
	1010101100			venti	ntr	,		up		gy	
				on	ol						
									measured BP was above target.		
									Individual BP measure-		
									ments were taken by community		
									health workers using an		
									automated BP device with		
									Bluetooth transmission		
									capability		
						Mean					
						age;					
						Interv					
						ention			Community health workers with		
						=58.6			tailored behavioral		Community
	Vedanthan				49	Mean	Those with	15	communication, using smartphone	mHealth	health
16	et al, 2019	2019	Kenya	469	1	age;	hypertension	months	technology	tool	workers

		Publishe d year	Countr	SamplesizeCountr							
S.	Author					Age	Population/disease	Durati on of	Tune of Intervention	Type of eHealth	Type of non-
Ν	reference		У	Inter venti on	Co ntr ol)	condition	follow- up	Type of Intervention	technolo gy	physician
						contro l=61.3					
									CD nurse used a tablet computer		
									installed with the mWellcare		
									system to collect data on patient		
									history, blood pressure, blood	Electroni	
									glucose, depression, tobacco and	с	
	Prabhakar						Hypertension and		alcohol use, and current	decision	
	an et al,				18	≥30	diabetes	12	medications for a decision support	support	
18	2018	2018	India	1856	42	years	mellitus	months	recommendations.	system	Nurse
									Telemonitoring participants were		
									also asked to telephonically send		
									their BP readings to the		
	Artinian et				19	≥18		12	intervention nurse and their care	Telemon	
19	al, 2007	2007	USA	194	3	years	Hypertension	months	providers	itoring	Nurse

				Sample							
	Author and reference			size	size			Durati		Type of	
S.		Publishe	Countr			(vears	Population/disease	on of	Type of Intervention	eHealth	Type of non-
Ν		d year	У	Inter C	Co)	condition	follow-	Type of Intervention	technolo	physician
				venti	ntr			up		gy	
				on	ol						
									A practice nurse-led preventive		
									health check, a mobile application		
									and telephone coaching.		
									A lifestyle app (mysnapp)		
									designed to help patients and		
									consumers to manage their health		
									and	Mobile	
	Parker et		Australi					6	health coaching via the "Get	applicati	
20	al, 2022	2022	a	95	64	40–74	BMI ≥28	months	Healthy" telephone coaching	on	Nurse

				Mean difference	Weight
Study				with 95% CI	(%)
Up to 3 months					
Alsaque et al, 2022		•		-12.00 [-19.04, -4.96]	3.43
Ma et al, 2022		•		-11.48 [-14.08, -8.88]	6.43
Wong et al , 2022				-4.86 [-12.42, 2.70]	3.17
Zhai et al, 2020		•	-	-6.20 [-9.27, -3.13]	6.09
Heterogeneity: τ^2 = 7.11, I^2 = 61.55%, H^2 = 2.60				-8.84 [-12.34, -5.33]	
Test of $\theta_i = \theta_j$: Q(3) = 8.50, p = 0.04					
4-6 months					
Parker et al, 2022				-2.20 [-7.75, 3.35]	4.31
Jahan et al, 2020		-		-2.60 [-5.61, 0.41]	6.14
Cho et al, 2020					4.54
Green et al, 2014				-2.70 [-8.16, 2.76]	4.37
Heterogeneity: τ^2 = 3.46, I^2 = 38.17%, H^2 = 1.62				-1.15 [-4.09, 1.80]	
Test of $\theta_i = \theta_j$: Q(3) = 4.90, p = 0.18					
7-12 months					
Artinian et al, 2007			•	-3.10 [-7.42, 1.22]	5.17
Persall et al, 2018				0.10 [-3.33, 3.53]	5.83
Prabhakaran et al, 2018			• •	-2.00 [-3.14, -0.86]	7.23
Sarfo et al, 2018	-	•		-6.50 [-15.27, 2.27]	2.64
Tobe et al, 2018				0.60 [-4.37, 5.57]	4.70
Tian et al, 2015		-	•	-3.25 [-5.56, -0.94]	6.62
Vuaghan et al, 2021		•		-6.01 [-11.76, -0.26]	4.18
Margolis et al, 2022		•		-9.10 [-12.37, -5.83]	5.95
Heterogeneity: $\tau^2 = 7.17$, $I^2 = 74.98\%$, $H^2 = 4.00$		•		-3.38 [-5.72, -1.05]	
Test of $\theta_i = \theta_j$: Q(7) = 22.67, p = 0.00					
> 12 months					
Ogren et al, 2018		•	-	-6.10 [-9.42, -2.78]	5.91
He et al, 2017		- •	-	-5.30 [-6.99, -3.61]	6.98
Vedanthan et al, 2019				-0.60 [-3.37, 2.17]	6.31
Heterogeneity: $\tau^2 = 6.58$, $I^2 = 79.77\%$, $H^2 = 4.94$				-4.01 [-7.28, -0.74]	
Test of $\theta_i = \theta_j$: Q(2) = 9.31, p = 0.01					
Overall				-4.09 [-5.87, -2.32]	
Heterogeneity: τ^2 = 10.98, I ² = 82.31%, H ² = 5.65					
Test of $\theta_i = \theta_j$: Q(18) = 89.61, p = 0.00					
Test of group differences: $Q_b(3) = 11.18$, p = 0.01	_				
	-20	-10	0	10	
Random-effects REML model	Favou	irs interven	tion Favou	irs control	

Supplementary Figure S1: Reduction in systolic blood pressure by duration of intervention

Supplementary Figure S2: Reduction in systolic blood pressure reduction by type of eHealth technologies

Study		Mean difference with 95% Cl	Weight
Decision support	:		(/0)
Persall et al. 2018		0 10 [-3 33 3 53]	5 83
Prabhakaran et al. 2018		-2 00 [-3 14 -0 86]	7 23
Tian et al. 2015		-3 25 [-5 56 -0 94]	6.62
Vedanthan et al. 2019	—	-0.60 [-3.37 2.17]	6.31
Green et al. 2014		-2 70 [-8 16, 2 76]	4.37
Heterogeneity: $\tau^2 = 0.00$, $I^2 = 0.00\%$, $H^2 = 1.00$		-1.91 [-2.831.00]	
Test of $\theta_i = \theta_j$: Q(4) = 3.57, p = 0.47			
Mobile Application			
Alsaque et al, 2022		-12.00 [-19.04, -4.96]	3.43
Ma et al, 2022		-11.48 [-14.08, -8.88]	6.43
Parker et al, 2022		-2.20 [-7.75, 3.35]	4.31
Sarfo et al, 2018		-6.50 [-15.27, 2.27]	2.64
Wong et al, 2022	_	-4.86 [-12.42, 2.70]	3.17
Cho et al, 2020		3.91 [-1.30, 9.12]	4.54
Heterogeneity: r^2 = 31.70, I^2 = 80.91%, H^2 = 5.24		-5.53 [-10.69, -0.37]	
Test of $\theta_i = \theta_j$: Q(5) = 33.04, p = 0.00			
SMS			
Tobe et al, 2018	<u> </u>	— 0.60 [-4.37, 5.57]	4.70
He et al, 2017		-5.30 [-6.99, -3.61]	6.98
Jahan et al, 2020		-2.60 [-5.61, 0.41]	6.14
Zhai et al, 2020		-6.20 [-9.27, -3.13]	6.09
Heterogeneity: $\tau^2 = 3.72$, $I^2 = 63.37\%$, $H^2 = 2.73$	•	-3.95 [-6.38, -1.51]	
Test of $\theta_i = \theta_j$: Q(3) = 7.59, p = 0.06			
Telemedicine			
Artinian et al, 2007		-3.10 [-7.42, 1.22]	5.17
Ogren et al, 2018		-6.10 [-9.42, -2.78]	5.91
Vuaghan et al, 2021		-6.01 [-11.76, -0.26]	4.18
Margolis et al, 2022		-9.10 [-12.37, -5.83]	5.95
Heterogeneity: $\tau^{-} = 2.89$, $l^{-} = 41.37\%$, $H^{-} = 1.71$		-6.34 [-8.94, -3.73]	
Test of $\theta_i = \theta_j$: Q(3) = 4.90, p = 0.18			
Overall	↓ 1	-4.09 [-5.87, -2.32]	
Heterogeneity: τ^2 = 10.98, I^2 = 82.31%, H^2 = 5.65			
Test of $\theta_i = \theta_j$: Q(18) = 89.61, p = 0.00			
Test of group differences: $Q_b(3) = 12.48$, p = 0.01			
	-20 -10 0	10	
Tanuom-ellecis REIVIL model	ravours intervention Fa	vours control	

Decision support is defined as those tools and apps that support clinial decision and used by non-physician health workers such as lectronic health record tools, smartphone for community health workers or electronic decision support system Mobile application are the smart-phone based application used by articipants for selfmonitorng

SMS, short text message service

Telemedicine is defined as telephone based coaching, video-conferncing and phone based follow-ups other than text messaging

Supplementary Figure S3: Reduction in systolic blood pressure reduction by type of country income

Study				Mean difference with 95% Cl	Weight (%)
High-income countries			Ξ		
Artinian et al, 2007		. <u> </u>	•	-3.10 [-7.42, 1.22]	5.17
Ogren et al, 2018		•	- 1	-6.10 [-9.42, -2.78]	5.91
Parker et al, 2022			•	-2.20 [-7.75, 3.35]	4.31
Persall et al, 2018				— 0.10 [-3.33, 3.53]	5.83
Tobe et al, 2018			•	0.60 [-4.37, 5.57]	4.70
Wong et al, 2022				-4.86 [-12.42, 2.70]	3.17
Vuaghan et al, 2021		•		-6.01 [-11.76, -0.26]	4.18
Margolis et al, 2022		•	Ē	-9.10 [-12.37, -5.83]	5.95
Cho et al, 2020				3.91 [-1.30, 9.12]	4.54
Green et al, 2014			•	-2.70 [-8.16, 2.76]	4.37
Heterogeneity: $\tau^2 = 10.65$, $I^2 = 67.11\%$, $H^2 = 3.04$		•		-3.06 [-5.59, -0.52]	
Test of $\theta_i = \theta_j$: Q(9) = 29.44, p = 0.00			Ē		
Low-income countries			Ē		
Alsaque et al, 2022		-	Ē	-12.00 [-19.04, -4.96]	3.43
Prabhakaran et al, 2018				-2.00 [-3.14, -0.86]	7.23
Sarfo et al, 2018	_	•		6.50 [-15.27, 2.27]	2.64
Jahan et al, 2020		_	•	-2.60 [-5.61, 0.41]	6.14
Tian et al, 2015		_	•	-3.25 [-5.56, -0.94]	6.62
Vedanthan et al, 2019				-0.60 [-3.37, 2.17]	6.31
Heterogeneity: $\tau^2 = 0.00$, $I^2 = 0.00\%$, $H^2 = 1.00$			<u>ا</u>	-2.31 [-3.21, -1.40]	
Test of $\theta_i = \theta_j$: Q(5) = 10.57, p = 0.06			Ē		
Middle-income countries			Ē		
Ma et al, 2022		•		-11.48 [-14.08, -8.88]	6.43
He et al, 2017		- •		-5.30 [-6.99, -3.61]	6.98
Zhai et al, 2020		• •	-	-6.20 [-9.27, -3.13]	6.09
Heterogeneity: $\tau^2 = 9.70$, $I^2 = 86.58\%$, $H^2 = 7.45$			Ē	-7.61 [-11.42, -3.81]	
Test of $\theta_i = \theta_j$: Q(2) = 15.57, p = 0.00			Ē		
Overall			Ē	-4.09 [-5.87, -2.32]	
Heterogeneity: τ^2 = 10.98, I^2 = 82.31%, H^2 = 5.65			Ē		
Test of $\theta_i = \theta_j$: Q(18) = 89.61, p = 0.00			Ē		
Test of group differences: $Q_b(2) = 7.18$, p = 0.03					
Random-effects RFML model	-20 Favours	-10 intervention	Ó	10 Favours control	

Supplementary Figure S4: Reduction in systolic blood pressure reduction by involvement of physician intervention

Study					Mean diff. with 95% Cl	Weight (%)
No active physician intervention included			-			
Alsaque et al, 2022		—	÷		-12.00 [-19.04, -4.96]	3.43
Ma et al, 2022			:		-11.48 [-14.08, -8.88]	6.43
Artinian et al, 2007			—		-3.10 [-7.42, 1.22]	5.17
Parker et al, 2022			•		-2.20 [-7.75, 3.35]	4.31
Sarfo et al, 2018				_	-6.50 [-15.27, 2.27]	2.64
Tobe et al, 2018		+	•	 	0.60 [-4.37, 5.57]	4.70
Wong et al, 2022				_	-4.86 [-12.42, 2.70]	3.17
Jahan et al, 2020					-2.60 [-5.61, 0.41]	6.14
Tian et al, 2015			H.		-3.25 [-5.56, -0.94]	6.62
Margolis et al, 2022		•	-		-9.10 [-12.37,-5.83]	5.95
Zhai et al, 2020			÷		-6.20 [-9.27, -3.13]	6.09
Cho et al, 2020			-		3.91 [-1.30, 9.12]	4.54
Green et al, 2014			÷	_	-2.70 [-8.16, 2.76]	4.37
Heterogeneity: τ^2 = 14.87, I^2 = 78.84%, H^2 = 4.73		-			-4.59 [-7.07, -2.11]	
Test of $\theta_i = \theta_j$: Q(12) = 57.43, p = 0.00						
In combination with physician intervention						
Ogren et al, 2018			. :		-6.10 [-9.42, -2.78]	5.91
Persall et al, 2018		-	•	<u> </u>	0.10 [-3.33, 3.53]	5.83
Prabhakaran et al, 2018		1	•		-2.00 [-3.14, -0.86]	7.23
He et al, 2017		- • -	÷		-5.30 [-6.99, -3.61]	6.98
Vedanthan et al, 2019		-	•	-	-0.60 [-3.37, 2.17]	6.31
Vuaghan et al, 2021		-			-6.01 [-11.76,-0.26]	4.18
Heterogeneity: $\tau^2 = 4.84$, $I^2 = 77.75\%$, $H^2 = 4.49$					-3.12 [-5.25, -0.99]	
Test of $\theta_i = \theta_j$: Q(5) = 20.39, p = 0.00						
Overall		•			-4.09 [-5.87, -2.32]	
Heterogeneity: τ^2 = 10.98, I^2 = 82.31%, H^2 = 5.65						
Test of $\theta_i = \theta_j$: Q(18) = 89.61, p = 0.00			:			
Test of group differences: $Q_b(1) = 0.78$, p = 0.38						
Pandam affaata PEMI madal	-20	-10	Ó	1	0	
		avours interventio	лі Н	avours contro	1	

Study		Mean difference with 95% Cl	Weight (%)
Up to 3 months	:		
Alsaque et al, 2022		-3.51 [-7.25, 0.23]	4.49
Ma et al, 2022	E	-6.70 [-8.48, -4.92]	0.33
Wong et al, 2022		-1.03 [-5.38, 3.32]	3.75
Zhai et al, 2020		1.00 [-0.93, 2.93]	7.51
Heterogeneity: τ^2 = 3.48, I^2 = 46.27%, H^2 = 1.86		-0.94 [-3.72, 1.85]	
Test of $\theta_i = \theta_j$: Q(3) = 5.11, p = 0.16			
4-6 months			
Parker et al, 2022		-5.10 [-8.36, -1.84]	5.16
Jahan et al, 2020		-1.70 [-3.36, -0.04]	8.04
Cho et al, 2020		1.08 [-2.39, 4.55]	4.86
Green et al, 2014		-0.60 [-4.45, 3.25]	4.35
Heterogeneity: $\tau^2 = 3.34$, $I^2 = 60.46\%$, $H^2 = 2.53$		-1.66 [-4.00, 0.67]	
Test of $\theta_i = \theta_j$: Q(3) = 6.95, p = 0.07			
7-12 months			
Artinian et al, 2007	÷ P	0.30 [-2.26, 2.86]	6.33
Prabhakaran et al, 2018		-1.50 [-2.22, -0.78]	9.54
Sarfo et al, 2018		— 3.20 [-2.44, 8.84]	2.64
Tobe et al, 2018		-1.00 [-4.02, 2.02]	5.55
Vuaghan et al, 2021		-2.95 [-6.62, 0.72]	4.58
Margolis et al, 2022	-	0.30 [-0.90, 1.50]	8.86
Heterogeneity: $\tau^2 = 0.73$, $I^2 = 47.03\%$, $H^2 = 1.89$	•	-0.64 [-1.75, 0.47]	
Test of $\theta_i = \theta_j$: Q(5) = 10.56, p = 0.06			
>12 months			
Ogren et al, 2018		-3.50 [-5.69, -1.31]	7.02
He et al, 2017		-4.20 [-5.33, -3.07]	8.97
Vedanthan et al, 2019		1.20 [-0.47, 2.87]	8.01
Heterogeneity: $\tau^2 = 8.03$, $I^2 = 92.20\%$, $H^2 = 12.83$		-2.17 [-5.53, 1.18]	
Test of $\theta_i = \theta_j$: Q(2) = 28.13, p = 0.00			
Overall		-1.25 [-2.31, -0.18]	
Heterogeneity: τ^2 = 2.97, I^2 = 75.69%, H^2 = 4.11			
Test of $\theta_i = \theta_j$: Q(16) = 63.81, p = 0.00			
Test of group differences: $Q_b(3) = 1.17$, p = 0.76			
Random-effects REML model F	-10 -5 0 5 avours intervention Favours co	10 ontrol	

Supplementary Figure S5: Reduction in diastolic blood pressure reduction by duration of intervention

Study	Mean differen with 95% Cl	l ce Weight I (%)
Decision support		
Prabhakaran et al, 2018	-1.50 [-2.22, -0).78] 9.54
Vedanthan et al, 2019	1.20 [-0.47, 2	2.87] 8.01
Green et al, 2014	-0.60 [-4.45, 3	3.25] 4.35
Heterogeneity: τ^2 = 1.96, I^2 = 72.98%, H^2 = 3.70	-0.37 [-2.30, 1	.57]
Test of $\theta_i = \theta_j$: Q(2) = 8.50, p = 0.01		
Mobile application		
Alsaque et al, 2022	-3.51 [-7.25, 0).23] 4.49
Ma et al, 2022	-6.70 [-8.48, -4	.92] 0.33
Parker et al, 2022	-5.10 [-8.36, -1	.84] 5.16
Sarfo et al, 2018	3.20 [-2.44, 8	3.84] 2.64
Wong et al, 2022	-1.03 [-5.38, 3	3.32] 3.75
Cho et al, 2020	1.08 [-2.39, 4	1.55] 4.86
Heterogeneity: $\tau^2 = 6.08$, $I^2 = 55.07\%$, $H^2 = 2.23$	-1.54 [-4.32, 1	.24]
Test of $\theta_i = \theta_j$: Q(5) = 10.80, p = 0.06		
SMS		
Tobe et al, 2018	-1.00 [-4.02, 2	2.02] 5.55
He et al, 2017	-4.20 [-5.33, -3	3.07] 8.97
Jahan et al, 2020	-1.70 [-3.36, -0).04] 8.04
Zhai et al, 2020	1.00 [-0.93, 2	2.93] 7.51
Heterogeneity: $\tau^2 = 4.33$, $I^2 = 84.44\%$, $H^2 = 6.43$	-1.60 [-3.86, 0).67]
Test of $\theta_i = \theta_j$: Q(3) = 23.08, p = 0.00		
Telemedicine		
Artinian et al, 2007	0.30 [-2.26, 2	2.86] 6.33
Ogren et al, 2018	-3.50 [-5.69, -1	.31] 7.02
Vuaghan et al, 2021	-2.95 [-6.62, 0).72] 4.58
Margolis et al, 2022		.50] 8.86
Heterogeneity: τ^2 = 3.04, I^2 = 71.30%, H^2 = 3.48	-1.25 [-3.33, 0).82]
Test of $\theta_i = \theta_j$: Q(3) = 10.94, p = 0.01		
Overall	-1.25 [-2.31, -0	.18]
Heterogeneity: $\tau^2 = 2.97$, $I^2 = 75.69\%$, $H^2 = 4.11$		
Test of $\theta_i = \theta_j$: Q(16) = 63.81, p = 0.00		
Test of group differences: $Q_b(3) = 0.85$, p = 0.84	I =	
-10 Random-effects REML model Favor) -5 0 5 10 Irs Intervention Favours Control	

Supplementary Figure S6: Reduction in diastolic blood pressure reduction by type of eHealth

technologies

Decision support is defined as those tools and apps that support clinial decision and used by non-physician health workers such as lectronic health record tools, smartphone for community health workers or electronic decision support system Mobile application are the smart-phone based application used by articipants for selfmonitorng

SMS, short text message service

Telemedicine is defined as telephone based coaching, video-conferncing and phone based follow-ups other than text messaging

Study					Mean difference with 95% Cl	Weight (%)
High-income countries			-			
Artinian et al, 2007		-	-		0.30 [-2.26, 2.86]	6.33
Ogren et al, 2018			÷.		-3.50 [-5.69, -1.31]	7.02
Parker et al, 2022		•	÷.		-5.10 [-8.36, -1.84]	5.16
Tobe et al, 2018			•	-	-1.00 [-4.02, 2.02]	5.55
Wong et al, 2022			•		-1.03 [-5.38, 3.32]	3.75
Vuaghan et al, 2021					-2.95 [-6.62, 0.72]	4.58
Margolis et al, 2022			-		0.30 [-0.90, 1.50]	8.86
Cho et al, 2020		-	-	<u> </u>	1.08 [-2.39, 4.55]	4.86
Green et al, 2014			•		-0.60 [-4.45, 3.25]	4.35
Heterogeneity: $\tau^2 = 2.34$, $I^2 = 56.49\%$, $H^2 = 2.30$					-1.30 [-2.71, 0.10]	
Test of $\theta_i = \theta_j$: Q(8) = 18.92, p = 0.02						
Low-income countries						
Alsaque et al, 2022	-	•			-3.51 [-7.25, 0.23]	4.49
Prabhakaran et al, 2018			E.		-1.50 [-2.22, -0.78]	9.54
Sarfo et al, 2018			1		- 3.20 [-2.44, 8.84]	2.64
Jahan et al, 2020			H.		-1.70 [-3.36, -0.04]	8.04
Vedanthan et al, 2019			-	F	1.20 [-0.47, 2.87]	8.01
Heterogeneity: τ^2 = 2.06, I^2 = 72.04%, H^2 = 3.58		•			-0.81 [-2.44, 0.82]	
Test of $\theta_i = \theta_j$: Q(4) = 12.72, p = 0.01						
Middle-income countries						
Ma et al, 2022			Ē		-6.70 [-8.48, -4.92]	0.33
He et al, 2017		- • -	Ē		-4.20 [-5.33, -3.07]	8.97
Zhai et al, 2020				—	1.00 [-0.93, 2.93]	7.51
Heterogeneity: τ^2 = 11.24, I^2 = 89.69%, H^2 = 9.70			\geq		-1.96 [-6.60, 2.68]	
Test of $\theta_i = \theta_j$: Q(2) = 20.85, p = 0.00						
Overall		•			-1.25 [-2.31, -0.18]	
Heterogeneity: τ^2 = 2.97, I^2 = 75.69%, H^2 = 4.11			Ē			
Test of $\theta_i = \theta_j$: Q(16) = 63.81, p = 0.00						
Test of group differences: $Q_b(2) = 0.33$, p = 0.85				1		
Random-effects RFML model	-10 Favours	-5 Intervention	0 F	5 avours Control	10	

Supplementary Figure S7: Reduction in diastolic blood pressure reduction by country income

Study					Mean diff. Weight with 95% Cl (%)
No active physician intervention included				-	
Alsaque et al, 2022			_		-3.51 [-7.25, 0.23] 4.49
Ma et al, 2022					
Artinian et al, 2007				-	0.30 [-2.26, 2.86] 6.33
Parker et al, 2022			-		-5.10 [-8.36, -1.84] 5.16
Sarfo et al, 2018				-	— 3.20 [-2.44, 8.84] 2.64
Tobe et al, 2018					-1.00 [-4.02, 2.02] 5.55
Wong et al, 2022					-1.03 [-5.38, 3.32] 3.75
Jahan et al, 2020					-1.70 [-3.36, -0.04] 8.04
Margolis et al, 2022				•	0.30 [-0.90, 1.50] 8.86
Zhai et al, 2020				-	1.00 [-0.93, 2.93] 7.51
Cho et al, 2020					1.08 [-2.39, 4.55] 4.86
Green et al, 2014					-0.60 [-4.45, 3.25] 4.35
Heterogeneity: τ^2 = 1.50, I^2 = 45.79%, H^2 = 1.84				•	-0.66 [-1.78, 0.46]
Test of $\theta_i = \theta_j$: Q(11) = 19.54, p = 0.05				÷	
In combination with physician intervention					
Ogren et al, 2018					-3.50 [-5.69, -1.31] 7.02
Prabhakaran et al, 2018					-1.50 [-2.22, -0.78] 9.54
He et al, 2017					-4.20 [-5.33, -3.07] 8.97
Vedanthan et al, 2019					1.20 [-0.47, 2.87] 8.01
Vuaghan et al, 2021			-		-2.95 [-6.62, 0.72] 4.58
Heterogeneity: τ^2 = 4.16, I^2 = 88.90%, H^2 = 9.01				•	-2.12 [-4.11, -0.14]
Test of $\theta_i = \theta_j$: Q(4) = 32.50, p = 0.00					
Overall				•	-1.25 [-2.31, -0.18]
Heterogeneity: τ^2 = 2.97, I^2 = 75.69%, H^2 = 4.11				-	
Test of $\theta_i = \theta_j$: Q(16) = 63.81, p = 0.00					
Test of group differences: $Q_b(1) = 1.57$, p = 0.21		1			
Random-effects REML model	-30	-20 Favours (-10 CHW interve	0 _{ention} Favo	10 urs control

Supplementary Figure S8: Reduction in diastolic blood pressure reduction by engagement of physician intervention

Supplementary Figure S9A: Contoured enhanced plot for publication bias for systolic blood pressure



Supplementary Figure S9B: Contoured enhanced plot for publication bias for diastolic blood pressure

