

# *Factors Associated with Underreporting of Adverse Drug Reactions by Health Care Professionals: A Systematic Review Update*

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**Table S1.** Articles that analyze the influence of personal and professional factors in the notification of adverse drug reactions: methods description

**Table S2.** Articles that analyse the influence of personal and professional factors and attitudes of health professionals in the reporting of adverse drug reactions

**Table S3:** Influential factors in adverse drug reactions underreporting.

**Table S1.** Articles that analyze the influence of personal and professional factors in the notification of adverse drug reactions: methods description

AUTHOR (Publication Year)	COUNTRY	STUDY POPULATION	WORKPLACE	SAMPLE SIZE	SURVEY DISTRIBUTION	SCALE	AXIS tool not fulfilled criteria <sup>d</sup>
Haines et al. [1] (2020)	South Africa	1,2,3	B	218 d	218 d	NM	7,14,15
Gidey et al. [2] (2020)	Ethiopia	1,2,3	A	362 d	362 d	MC, FT	14
Nadew et al. [3] (2020)	Ethiopia	1	A	422 d	422 d	Likert	6,14
Melo et al. [4] (2020)	Brazil	1,2,3,6	NM	NM f	NM f	NM	3,5,6,7,14,20
Braiki et al. [5] (2019) c	Tunisia	1,3,6	A	150 d	150 d	Likert	5,6,7,10,11,14
Alemu and Biru [6] (2019)	Ethiopia	1,2,3,4,6	A	120 d	120 d	MC, Likert	5,6,7,14,15
Le et al. [7] (2019)	Vietnam	1,2,3	A	2600 d	2600 d	Likert	3,6,7,14,15
Kopciuch et al. [8] (2019)	Poland	2	C	899 d	899 d	NM	7,14
Hughes and Weiss [9] (2019)	UK	2	C	713 a	713 a	FT, Likert	3,6,7,11,14,18
Danekhu et al. [10] (2019)	Nepal	1,2,3	A	215 d	215 d	Likert	5,7,14,15
Adisa and Omitogun [11] (2019) b	Nigeria	1,3,6	B	80 d	80 d	Likert	14
Ergün et al. [12] (2018)	Turkey	2,3	A	783 d	783 d	MC, FT	3,14
Thompson et al. [13] (2018)	UK	2,3	NM	NM f	NM f	NM	3,4,5,6,7,13,14,20
Li et al. [14] (2018)	Australia	2	C	263 f	263 f	MC, FT, Likert	5,6,7,14
Seid et al. [15] (2018)	Ethiopia	1,2,3	B	102 d	102 d	MC, Likert	3,4,5,14
Bahnassi and Al-Harbi [16] (2018)	Syria	2	A,C	656 d	656 d	MC, FT, Likert	7,11,14
Lemay et al. [17] (2018)	Kuwait	1,2	B	583 d	583 d	NM	7,14,19
Terblanche et al. [18] (2017)	South Africa	1,2,3	A	200 d	200 d	MC, FT	6,7,9,14
Hajj et al. [19] (2017)	Lebanon	2	C	2000 d	2000 d	NM	7,14,15
Hammour et al. [20] (2017)	Jordan	1,3	A	670 NM	670 NM	Likert	6,7,14,15
Cheema et al. [21] (2017)	UK	2	C	230 a,f	230 a,f	MC	6,7,14,15
Gurmesa and Dedefo [22] (2016)	Ethiopia	1,2,3,4	A,D	133 NM	133 NM	NM	7,10,11,14,18
Almandil [23] (2016)	Saudi Arabia	1,2,3,6	A	400 c,f	400 c,f	NM	3,7,14,15
Stergiopoulos et al. [24] (2016)	USA	1,2,3	A,C,D	284 f	284 f	Likert	3,6,7,9,11,14,15,20
Peymani et al. [25] (2016)	Iran	1	A,D	350 d	350 d	MC, FT	6,11,14,15,18
Amin et al. [26] (2016)	Bangladesh	2,6	C	292 d	292 d	Likert	6,14
Yu et al. [27] (2016)	Korea	2	C	1315 d,f	1315 d,f	Likert	6,14
Marques et al. [28] (2016)	Portugal	3	A,B	1325 a	1325 a	VAS	14,15
Cerruti et al. [29] (2016)	Canada	2	A	252 f	252 f	MC, FT	6,7,10,11,14
Katusiime et al. [30] (2015)	Uganda	1,2,3,5	A	289 d	289 d	NM	7,14
Angelis et al. [31] (2015)	Italy	3	A	773 NM	773 NM	MC, Likert	3,5,6,7,10,11,14
Alshammari et al. [32] (2015)	Saudi Arabia	1,2,3	A	NM d	NM d	NM	3,6,7,14,15
Nde et al. [33] (2015)	Cameroon	1,2,3	O	200 NM	200 NM	NM	6,9,11,14,16,18,20
Liu et al. [34] (2015)	China	2	A	558 a	558 a	MC, FT, Likert	7,14
Tandon et al. [35] (2015)	India	1,2,3,5	A	300 d	300 d	NM	3,5,6,7,14,18
Sabbiah et al. [36] (2014)	Ghana	1	A	300 d	300 d	NM	3,11,14,15,17,18
Kiguba et al. [37] (2014)	Uganda	1,2,3	A,B,C	2000 d	2000 d	Likert	6,7,14
Affifi et al. [38] (2014)	Iran	2	A,C	120 d	120 d	MC, FT	3,6,7,11,14,15
Elkalmi et al. [39] (2014)	Malaysia	2	C	470 d	470 d	MC, FT, Likert	3,5,7,14,15,19,20
Wilbur [40] (2013)	Qatar	2	NM	568 f	568 f	NM	7,10,11,14
Sanghavi et al. [41] (2013) a	India	1,5	A	220 d	220 d	NM	3,6,7,10,11,14,19
Stoyanova et al. [42] (2013) a	Bulgaria	1	A,B	135 d	135 d	NM	7,14,20
Yip et al. [43] (2013)	UK	1	NM	430 a	430 a	FT, Likert	7,11,13,14,15,18,19
Santosh et al. [44] (2013)	Nepal	1,2,3	A	450 d	450 d	Likert	3,5,6,7,14,15
Stewart et al. [45] (2013)	UK	2,3	NM	3351 f	3351 f	FT, Likert	3,7,13,14,15
Agarwal et al. [46] (2013)	Malaysia	1	D	238 d	238 d	NM	3,7,14,18
Pimpalkhute et al. [47] (2012)	India	5	A	90 d	90 d	NM	3,6,7,9,10,11,14,18
Biagi et al. [48] (2012) a	Italy	1	O	737 a	737 a	NM	7,9,10,11,13,14,20
Prakasam et al. [49] (2012)	India	2	C	650 d	650 d	MC	3,7,9,10,11,14,18,20
Scicchitano et al. [50] (2012)	Italy	1,2	NM	1048 d,f	1048 d,f	NM	3,5,6,7,9,10,11,14,15,18,20
Chopra et al. [51] (2011)	India	1	A	100 NM	100 NM	MC	3,5,7,9,10,11,14,15,19,20
Palaian et al. [52] (2011)	Nepal	1,2,3	A	185 d	185 d	NM	5,6,7,14,20
Oreagba et al. [53] (2011)	Nigeria	2	C	400 d	400 d	Likert	7,14,15,18
Moumtzoglou [54] (2010)	Greece	1	A	350 c	350 c	MC, Likert	7,14,19,20
Gavaza et al. [55] (2010)	USA	2	A,C	1500 a	1500 a	FT	3,5,6,9,10,11,14,19
Su et al. [56] (2010)	China	2	A	288 b	288 b	MC	3,5,6,7,11,14,19
Ohaju-Obodo and Iribhogbe [57] (2010)	Nigeria	5	A	350 NM	350 NM	NM	7,9,11,14,16,18,19,20
Oshikoya et al. [58] (2009)	Nigeria	1	A	120 c	120 c	NM	3,5,6,7,14
Elnour et al. [59] (2009)	Sudan	1,2,3,5	A,C	600 NM	600 NM	NM	14,19
Vessal et al. [60] (2009)	Iran	2	C	200 d	200 d	NM	5,6,7,10,11,14,19,20
Ekman and Bäckström [61] (2008)	Sweden	1	A	1201 a	1201 a	NM	7,14,19,20
Okezie and Olufunmilayo [62] (2008)	Nigeria	5	A	211 d	211 d	NM	7,14,18,19
Toklu and Uysal [63] (2008)	Turkey	2	C	411 b	411 b	FT, Likert	7,14
Gossell-Williams et al. [64] (2008)	Jamaica	2	C	102 d	102 d	NM	2,3,7,9,10,11,14,15,18,20
Irujo et al. [65] (2007)	Spain	2	C	80 d	80 d	MC, FT, Likert	3,7,14

a) Pre-intervention data (reference data).

b) Article with professionals and patients' information (only the data on professionals is collected)

c) Did not have a Pharmacovigilance System implemented at the time of study.

d) AXIS tool: criteria not met.

1-Doctor, 2-Pharmacist, 3-Nurse, 4-Administrators, 5-Residents, 6-Other health professionals

A-Hospital, B-Primary Care, C-Pharmacy, D-Private Clinic, O-Others, U-University, NM-Not mentioned

a-Postcard, b-Interviewer, c-Internal mail, d-Directly Administered, NM-Not Mentioned, f-Internet

MC-Multiple-choice, FT-Free Text, VAS-Visual Analogue Scale, Likert, NM-Not Mentioned

**Table S2.** Articles that analyse the influence of personal and professional factors and attitudes of health professionals in the reporting of adverse drug reactions

AUTHOR	RESPONSE RATE (%)	PERSONAL AND PROFESSIONAL FACTORS	REASONS TO NOT REPORTING ADRs
Haines et al. [1] (2020)	91.7%		fr, ig, in, is, le, others
Gidey et al. [2] (2020)	84.8%	Years of experience, Training	co, di, in, le
Nadew et al. [3] (2020)	96.0%	Sex, Qualification, Years of experience	di, la, ig, in, le, Obligation, Confidentiality
Melo et al. [4] (2020)	NM	Region	ig, le, uf, others, Information
Braiki et al. [5] (2019) c	100.0%		la, ig, le
Alemu and Biru [6] (2019)	95.0%	Profession	co, fe, la, ig, in, is, le, uf, others, Obligation
Le et al. [7] (2019)	80.4%	Training	fr, la, ig, le, uf
Kopciuch et al. [8] (2019)	58.0%	Age, Qualification, Years of experience	fr, ig, is, le, uf, others
Hughes and Weiss [9] (2019)	52.0%		di, ig, is, le, others, Obligation, Information
Danekhu et al. [10] (2019)	100.0%		ig, others, Information
Adisa and Omitogun [11] (2019) b	100.0%	Qualification, Years of experience	co, la, ig, uf
Ergün et al. [12] (2018)	61.6%		co, di, fe, la, ig, in, is, le, uf, others, Information
Thompson et al. [13] (2018)	20.0%	Profession, Training, Years of experience	co, di, le, others, Information
Li et al. [14] (2018)	NM		fr, le, others
Seid et al. [15] (2018)	NM	Profession, Training	co, di, ig, le, uf, others
Bahnassi and Al-Harbi [16] (2018)	77.0%		co, la, ig, le, uf, others
Lemay et al. [17] (2018)	83.2%		ig, le, others, Confidentiality
Terblanche et al. [18] (2017)	66.0%		di, ig, in, is, le, others
Hajj et al. [19] (2017)	92.8%	Sex, Qualification	di, ig, le, others, Information
Hammour et al. [20] (2017)	50.7%	Profession	la, ig, le others, Information
Cheema et al. [21] (2017)	60.0%		co, ig, is, le, others, Information
Gurmesa and Dedefo [22] (2016)	100.0%		ig, le, uf, others
Almandil [23] (2016)	82.8%		ig, others, Confidentiality
Stergiopoulos et al. [24] (2016)	43.3%	Profession	di, fb, ig, is, le, others, Information
Peymani et al. [25] (2016)	95.1%		co, di, ig, le
Amin et al. [26] (2016)	69.5%		di, ig, le, uf, others
Yu et al. [27] (2016)	NM	Age, Prior Experience with ADR	co, fr, la, ig, is, le, others, Obligation
Marques et al. [28] (2016)	34.2%	Workplace	ig, in, le, Obligation
Cerruti et al. [29] (2016)	66.0%		fe, la, ig, is, le, others
Katusiime et al. [39] (2015)	77.2%	Age, Profession, Years of experience	co, di, fb, fr, la, ig, in, is, le, others, Obligation
Angelis et al. [31] (2015)	73.8%		fe, ig, in, le, others, Obligation
Alshammari et al. [32] (2015)	72.0%		fr, in, is, le
Nde et al. [33] (2015)	NM		ig, uf, others
Liu et al. [34] (2015)	91.2%	Seniority of position, Training	ig, le, uf, Obligation
Tandon et al. [35] (2015)	NM		co, di, ig, in, is, le
Sabblah et al. [36] (2014)	86.3%	Seniority of position, Training, Workplace	co, ig, le, uf, others
Kiguba et al. [37] (2014)	67.0%	Age, Speciality, Workplace, Type of health facility (private vs public)	co, fb, la, ig, in, is, le, Obligation
Afifi et al. [38] (2014)	83.3%		co, ig, is, le, others
Elkalmi et al. [39] (2014)	24.7%		co, di, la, ig, le, uf, others, Confidentiality
Wilbur [40] (2013)	25.0%	Age, Sex, Practice site (outpatient vs inpatient), Duration of practice	ig
Sanghavi et al. [41] (2013) a	36.4%		co, di, fr, la, ig, in, is, le, others
Stoyanova et al. [42] (2013) a	91.0%		co, di, ig, le, others
Yip et al. [43] (2013)	30.2%	Years of experience, Training location (Europe vs outside Europe)	di, ig, le, Obligation
Santosh et al. [44] (2013)	74.0%		co, di, am, fe, la, in, is, le, uf
Stewart et al. [45] (2013)	20.4%		le, others
Agarwal et al. [46] (2013)	61.0%	Qualification	co, di, am, fr, fe, la, ig, in, is, le, uf, others, Obligation, Confidentiality
Pimpalkhute et al. [47] (2012)	93.3%		ig, le, uf
Biagi et al. [48] (2012) a	22.8%		co, di, fr, ig, le, uf, others
Prakasam et al. [49] (2012)	53.3%		co, di, fb, ig, le, Information
Scicchitano et al. [50] (2012)	NM		di
Chopra et al. [51] (2011)	100.0%		ig, le, uf
Palaian et al. [52] (2011)	67.9%	Sex, Profession	co, fb, ig
Oreagba et al. [53] (2011)	83.0%	Years of experience	fr, ig
Moumtzoglou [54] (2010)	NM		in, le
Gavaza et al. [55] (2010)	16.4%		di, fb, fr, la, ig, le, uf, others, Information
Su et al. [56] (2010)	85.4%	Age, Workplace, Training	co, la, ig, in, is, le, uf, others
Ohaju-Obodo and Iribhogbe [57] (2010)	NM	Workplace	ig
Oshikoya et al. [58] (2009)	82.5%		co, di, fr, fe, ig, is, le
Elnour et al. [59] (2009)	79.2%	Workplace	co, fr, ig, is, le, others
Vessal et al. [60] (2009)	55.0%		co, di, la, ig, le, uf, Information
Ekman and Bäckström [61] (2008)	54.0%		co, di, ig, le, others
Okezie and Olufunmilayo [62] (2008)	91.0%	Graduation University	di, ig, in, is
Toklu and Uysal [63] (2008)	53.0%		ig, le, others, Obligation
Gossell-Williams et al. [64] (2008)	100.0%		co, di, le, Confidentiality, Information
Irujo et al. [65] (2007)	95.0%		co, di, ig, le, others

a) Pre-intervention data (reference data).

b) Article with professionals and patients' information (only the data on professionals is collected).

c) Did not have a Pharmacovigilance System implemented at the time of study.

Co-complacency, Di-diffidence, Fb-feedback, Fe-fear, La-legal aspects, Fr-financial reimbursement, Am-ambition, Ig-ignorance, In-indifference, Is-insecurity, Le-lethargy, Uf-unavailability of the reporting form, NM-not mention.

**Table S3:** Influential factors in adverse drug reactions underreporting

Author (Year of publication)	co	di	fb	am	fr	fe	la	ig	in	is	le	uf	Obligation	Confidentiality	Information	others
Haines et al. [1] (2020)					23.5%			60.5%	19.0%	49%	39.5%					28%
Gidey et al. [2] (2020)	26.7%	63.2%							33.6%		61.3%					
Nadew et al. [3] (2020)		93.6%					51.4%	3.9%	11.0%		13.5%		95.3%	8.6%		
Melo et al. [4] (2020)								6.9%			18.5%	23.4%			33.7%	3.5%
Braiki et al. [5] (2019) <sup>c</sup>							86.0%	95.0%			86.7%					
Alemu and Biru [6] (2019)	70.2%					69.3%	51.8%	50.0%	66.2%	53.5%	62.3%	39.5%	73.7%			36.0%
Le et al. [7] (2019)					22.2%		19.4%	55.8%			38.0%	36.6%				
Kopciuch et al. [8] (2019)					25.0%			76.0%			32.0%	77.0%	12.0%			37.0%
Hughes and Weiss [9] (2019)		15.0%						36.0%			31.0%	11.5%	12.0%		8.0%	4.0%
Danekhu et al. [10] (2019)								35.9%							17.2%	47.0%
Adisa and Omitogun [11] (2019) <sup>b</sup>	9.4%						3.7%	21.1%				37.4%				
Ergün et al. [12] (2018)	32.5%	43.0%				53.5%	42.5%	57.8%	37.5%	31.0%	47.5%	46.5%			38.0%	37.5%
Thompson et al. [13] (2018)	2.1%	4.6%									3.7%				5.6%	2.7%
Li et al. [14] (2018)					64.6%						43.5%					22.4%
Seid et al. [15] (2018)	21.6%	37.3%						52.9%			34.8%	51.0%				47.1%
Bahnassi and Al-Harbi [16] (2018)	9.6%						12.9%	37.8%			46.2%	70.2%				7.4%
Lemay et al. [17] (2018)								37.7%			11.4%			14.8%		11.4%
Terblanche et al. [18] (2017)		22.0%						54.5%	22.7%	34.1%	37.1%					32.6%
Hajj et al. [19] (2017)		15.0%						23.0%			15.1%				23.2%	23.4%
Hammour et al. [20] (2017)							30.9%	39.3%			53.5%				68.8%	50.9%
Cheema et al. [21] (2017)	37.0%							12.3%		23.9%	46.4%				26.8%	12.4%
Gurmesa and Dedefo [22] (2016)								30.8%			25.5%	16.5%				11.3%
Almandil [23] (2016)								30.7%						10.3%		9.3%
Stergiopoulos et al. [24] (2016)		66.0%	48.0%					51.0%		47.0%	63.0%				31.0%	45.5%
Peymani et al. [25] (2016)	17.5%	6.6%						26.1%			10.8%					
Amin et al. [26] (2016)		86.2%						81.8%			66.3%	99.5%				95.5%
Yu et al. [27] (2016)	79.7%				39.9%		16.5%	55.6%		73.3%	38.9%		20.9%			23.8%
Marques et al. [28] (2016)								v	v		v		v			
Cerruti et al. [29] (2016)						4.0%	6.0%	19.0%		41.0%	69.0%					18.0%
Katusiime et al. [39] (2015)	11.7%	18.0%	48.0%		38.1%		17.9%	44.1%	18.8%	28.7%	39.9%		12.1%			8.1%
Angelis et al. [31] (2015)						9.2%		3.6%	5.1%		17.7%		14.7%			20.0%
Alshammari et al. [32] (2015)					39.0%				27.3%	47.4%	47.4%					
Nde et al. [33] (2015)								9.0%				11%				4.7%
Liu et al. [34] (2015)								47.4%			12.6%	13.3%	26.7%			
Tandon et al. [35] (2015)	79.3%	85.0%						70.2%	87.7%	79.0%	83.7%					
Sabblah et al. [36] (2014)	16.0%							17.0%			9.0%	43.1%				9.0%
Kiguba et al. [37] (2014)	61.7%		45.4%				14.3%	40.6%	16.2%	39.8%	12.9%		76.3%			
Afifi et al. [38] (2014)	30.0%							40.0%		14.0%	26.0%					4.0%
Elkalmi et al. [39] (2014)	44.0%	24.0%					16%	43.0%			36.0%	52.0%		17.0%		33.5%
Wilbur [40] (2013)								34.0%								
Sanghavi et al. [41] (2013) <sup>a</sup>	8.8%	25.0%			20.0%		35%	60.0%	31.3%	41.0%	43.0%					14.0%
Stoyanova et al. [42] (2013) <sup>a</sup>	18.8%	38.4%						19.4%			12.2%					10.0%
Yip et al. [43] (2013)		9.2%						7.7%			36.2%		14.6%			
Santosh et al. [44] (2013)	33.2%	34.4%		21.1%		24.5%	28.8%		36.4%	34.7%	36.0%	48.1%				
Stewart et al. [45] (2013)											v					v
Agarwal et al. [46] (2013)	81.9%	7.8%		10.6%	20.6%	37.5%	29.0%	56.9%	23.5%	52.1%	40.6%	68.9%	80.6%	46.9%		47.8%
Pimpalkhute et al. [47] (2012)								34.0%			22.6%	4.76%				
Biagi et al. [48] (2012) <sup>a</sup>	17.9%	29.5%			5.4%			10.5%			22.0%	14.3%				26.2%
Prakasam et al. [49] (2012)	52.9%	28.2%	6.9%					26.5%			30.5%				22.2%	
Scicchitano et al. [50] (2012)		84.0%														
Chopra et al. [51] (2011)								45.0%			20.0%	15.0%				
Palaian et al. [52] (2011)	14.3%		10.7%					14.3%								
Oreagba et al. [53] (2011)					9.6%			44.6%								
Moumtzoglou [54] (2010)									v		v					
Gavaza et al. [55] (2010)		10.0%	13.3%		3.3%		10.0%	21.7%			18.4%	13.3%			23.3%	23.3%
Su et al. [56] (2010)	26.0%						6.7%	42.9%	5.7%	81.9%	32.6%	30.5%				2.9%
Ohaju-Obodo and Iribhogbe [57] (2010)								47.4%								
Oshikoya et al. [58] (2009)	27.2%	12.1%				15.2%		36.4%		47.5%	33.3%					
Elnour et al. [59] (2009)	6.0%				4%			27.0%		15.0%	3.0%					6.0%
Vessal et al. [60] (2009)	25.0%	43.0%					4.5%	4.5%			6.8%	23.0%			13.6%	
Ekman and Bäckström [61] (2008)	68.9%	21.9%						19.8%			23.5%					
Okezie and Olufunmilayo [62] (2008)		25.6%						69.0%	4.3%	26.5%						
Toklu and Uysal [63] (2008)								14.0%			6.0%		5.0%			12.0%
Gossell-Williams et al. [64] (2008)	50.0%	18.0%									32.0%			12.0%	35.0%	
Irujo et al. [65] (2007)	63.4%	32.3%						45.3%			18.2%					16.3%
<b>MEDIAN OF RESPONDENTS</b>	<b>28.6%</b>	<b>26.9%</b>	<b>29.4%</b>	<b>15.9%</b>	<b>22.2%</b>	<b>24.5%</b>	<b>19.5%</b>	<b>37.8%</b>	<b>23.5%</b>	<b>34.4%</b>	<b>33.3%</b>	<b>37.4%</b>	<b>20.9%</b>	<b>13.4%</b>	<b>23.3%</b>	<b>16.3%</b>

a) Pre-intervention data (reference data).

b) Article with professionals and patients' information (only the data on professionals is collected).

c) Did not have a Pharmacovigilance System implemented at the time of study.

Co-complacency, Di-diffidence, Fb-feedback, Fe-fear, La-legal aspects, Fr-financial reimbursement, Am-ambition, Ig-ignorance, In-indifference, Is-insecurity, Le-lethargy, Uf-unavailability of the reporting form, NM-not mention

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