

Prevalence of drug interactions in hospitalized elderly patients: a systematic review

Luciana Mello de Oliveira 1,2; Juliana do Amaral Carneiro Diel¹; Alessandra Nunes³; Tatiane da Silva Dal Pizzol 1,2,3

¹Programa de Pós-Graduação em Epidemiologia, Faculdade de Medicina, Universidade Federal do Rio Grande do Sul.

²Programa de Pós-Graduação em Assistência Farmacêutica, Faculdade de Farmácia, Universidade Federal do Rio Grande do Sul.

³Faculdade de Farmácia, Universidade Federal do Rio Grande do Sul.

Corresponding author: Luciana Mello de Oliveira – oliveirm@gmail.com and Tatiane da Silva Dal Pizzol – tatiane.silva@ufrgs.br

Supplementary Table 2: Descriptive analysis of the included studies (n=34).

First author	Year	Country	Study design	Setting	Population	n	Database	Mean of drugs	DDI prevalence (%)
Barak-Tsarfir O, et al (58)	2016	Israel	Cohort	Geriatric rehabilitation ward	Elderly	70	Drug-Reax System®	N/A	80.5
Blix HS, et al (53)	2004	Norway	Cross-sectional	Internal medicine and rheumatology units in general hospitals	Patients admitted between May and December, 2002	827	National Therapy Guidelines and the Norwegian Drug Catalogue	7154 (mean 8,65 drugs/patient)*	8.8
Castilho ECD (27)	2018	Brazil	Cross-sectional	Public hospital	Patients aged 60 years or older, with diagnosis of a psychiatric disorder, more than one prescribed drug and confirmed availability of medical records with information about drug usage, admitted between 2004 and 2015.	94	Drug-Reax System®	median = 5.6	67.0%, 74.5% and 80.8% patients at admission, the median length of stay and at the last prescription, respectively.
Chahin RC (46)	2015	Venezuela	Cross-sectional	Internal medicine unit of university hospital	Patients aged 60 years or older admitted between June and December, 2015	83	Medscape® Drug Interaction Checker	2-5: 27%; 6-9: 57%; >10: 20%	100

Correia LM, et al (54)	2017	Portugal	Cross-sectional	Internal medicine unit of public hospital	Patients aged 90 years or older, admitted in 2012	422	Epocrates® Interaction Check	5,5 ± 3,1	NA - DDI was not the main objective of the study
Costa, SC (33)	2009	Brazil	Cross-sectional	Internal medicine unit of public hospital	Patients aged 60 years or older, admitted in 2006	149	Drug-Reax System®; Hansten & Horn's® Drug interactions analysis and management	10 ± 3.4	98.6
Cuentro VS (28)	2013	Brazil	Cross-sectional	Internal medicine, infectology and pneumology wards of University hospital	Patients aged 60 years or older, admitted between 2011 and 2012	258	Drug-Reax System®	1762 (6.83 drugs/patient)*	NA - DDI was not the main objective of the study
Danisha P, et al (37)	2015	India	Cross-sectional	Private hospital	Patients aged 60 years or older	200	Beers criteria	8.1	100
de Oliveira, LR (42)	2013	Brazil	Cross-sectional	District hospital	Patients aged 60 years or older, admitted between January and June, 2010	369	website IM.com.br	N/A	NA - Number of patients with interaction not provided.
Devarapalli P et al (40)	2017	India	Cross-sectional	Tertiary care hospital	Patients aged 60 years or older, more than one prescribed drug	135	Beers criteria	8.83 ± 0.16	43
Doan J, et al (15)	2013	Canada	Cohort	Nonsurgical wards of community hospital	Patients aged 65 years or older, with minimum 5 prescription-based oral medications, admitted between September 2010 and March 2011	275	InterMedRx®; FirstDataBank®; Stockley's Drug Interaction (online); Drug-Reax System®; Hansten & Horn's® Drug interactions analysis and management	13.9 ± 5.3	97- 80 (depending on the software used)
dos Santos RM, et al (35)	2011	Brazil	Cross-sectional	Surgical unit of philanthropic hospital	Patients aged 60 years or older admitted between August, 2009 and July, 2010	65	Drug-Reax System®; Stockley's Drug Interactions textbook	7.20 ± 2.24	NA - Number of patients with interaction not provided.
Egger T, et al (55)	2003	Germany	Cross-sectional	Geriatric rehabilitation unit	Patients aged 65 years or older, admitted between October, 2011 and February 2002	163	Not defined	14.0 ± 5.6	NA - DDI was not the main objective of the study
George AS, et al (38)	2018	India	Cross-sectional	General and surgical units	Elderly patients taking at least two medications	1116	Drug-Reax System®; Medscape® Drug Interaction Checker; Drugs®; Stockley's Drug Interaction textbook; other sources not defined	6-10: 594 (53.2); 11-15: 210 (18.8); 16-20: 26 (2.3); 20: 3 (0.3)	59.05
Ghibelli S, et al (56)	2013	Italia	Cross-sectional	Geriatric units in university hospital	Patients aged 65 years or older, admitted between April and May, 2012	74	Database developed by the Istituto di Ricerche	4.1 (0-14)	90.54, admission; 87.84, discharge

							farmacologiche Mario Negri		
Gutierrez-Valencia M, et al (52)	2017	Spain	Cross-sectional	Geriatric intensive care unit	Elderly patients admitted between January and February, 2015	200	BOT Plus tool®	9.1 ± 4.1	82.5
Jankovic SM, et al (47)	2018	Serbia	Cohort	Intensive care unit	Patients admitted between July and December, 2016	146	Medscape® Drug Interaction Checker; Epocrates® Interaction Check; Drug-Reax System®	23.9	Using Medscape® Drug Interaction Checker: 99.31 Using Epocrates® Interaction Check: 95.89 Using Drug-Reax System®: 93.84
Juárez-Cedillo T, et al (42)	2016	Mexico	Cross-sectional	Tertiary care hospital	Patients aged 70 years or older, admitted for at least 24 hours and receiving more than one medication, between January and April, 2015	98	Stockley's Drug Interactions textbook, Hansten & Horn's® Drug interactions analysis and management; Tatro® Drug Interaction Facts	6.0 ± 2.69	70.41
Kashyap M, et al (36)	2013	India	Cohort	Tertiary care teaching hospital	Patients aged 60 years or older	1510	Drug-Reax System®; Stockley's Drug Interaction (online)	9.15 ± 0.03	8.34
Locatelli, J (32)	2007	Brazil	Cross-sectional	Geriatric unit in private hospital	Patients aged 60 years or older, admitted between January, 2006 and January, 2007	155	Drug-Reax System®	13 (2-24)	NA - Number of patients with interaction not provided.
Matanovic SM, et al (45)	2013	Croacia	Cross-sectional	Internal medicine unit of university hospital	Patients aged 65 years or older	454	New screening tool; Beers criteria	6.1 ± 2.9	32.82
Melo DO, et al (33)	2015	Brazil	Cross-sectional	General medicine ward of university hospital	Patients aged 60 years or older, admitted between March and August, 2006	316	Drug-Reax System®	6.25 ± 2.82	78.2
Mohammed S, et al (39)	2017	India	Cross-sectional	University hospital	Patients admitted between November, 2015 and April, 2016	44	Drug-Reax System®; website drugs.com; other textbooks not defined	N/A	NA - DDI was not the main objective of the study
Narvekar RS, et al (41)	2017	India	Cross-sectional	Internal medicine wards of tertiary care teaching hospital	Patients aged 60 years or older, with a hospital stay of at least one day	150	Beers criteria	11.63 (range: 4–29).	NA - DDI was not the main objective of the study
Parreira RBC (34)	2016	Brazil	Cohort	Clinical and surgical units of public hospital	Patients aged 60 years or older, with a hospital stay of at least 48 hours in January, April and July, 2014	176	Drug-Reax System®	5.4 ± 2.8	NA - DDI was not the main objective of the study
Pedroso, FM (30)	2015	Brazil	Cross-sectional	Internal medicine unit of university hospital	Patients admitted between July and October, 2013	63	Drug-Reax System®	N/A	NA - DDI in elderly was not the main

									objective of the study
Sapkota S, et al (48)	2011	Nepal	Cross-sectional	Internal medicine wards of a tertiary care, university teaching hospital	Patients aged 65 years or older	305	Medscape® Drug Interaction Checker;	9.8±3.23	NA - DDI was not the main objective of the study
Radosevic N, et al (44)	2008	Croatia	Cross-sectional	Internal medicine wards of university hospital	Patients aged 65 years or older	142	Beers criteria	N/A	25.35
Rafiei H, et al (49)	2012	Iran	Cross-sectional	Intensive care units	Patients aged 65 years or older admitted from January 1st, 2011	70	Tatro® Drug Interaction Facts	5.6	NA - DDI in elderly was not the main objective of the study
Rosas-Carrasco O, et al (43)	2011	Mexico	Cross-sectional	Secondary care hospital	Patients aged 60 years or older	505	Drug-Reax System®	6 ± 2.51	62.77
Senín, LD (51)	2016	Spain	Cross-sectional	Internal medicine unit of private hospital	Patients aged 65 years or older, admitted between May and November, 2015	60	BOT Plus 2.0®; Stockley's Drug Interactions textbook	N/A	21.67
Schuler J, et al (57)	2008	Austria	Cross-sectional	Internal medicine units of university hospital	Patients aged 75 years or older	543	Medis® software	7.5 ± 3.8	65.8
Teka F, et al (50)	2016	Ethiopia	Cross-sectional	Internal medicine units	Patients aged 60 years or older, admitted between February and May, 2014	140	Drug-Reax System®	6 ± 4	62.2
Yong TY, et al (59)	2012	Australia	Cross-sectional	University hospital	Patients aged 65 years or older, admitted in March, 2009	200	Australian Medicines Handbook	N/A	NA - DDI was not the main objective of the study