

**APPENDIX A - 50 CASES OF ADMINISTRATION ERRORS: ORIGINAL VERSION<sup>4</sup> IN ENGLISH AND VERSION INTO ENGLISH AFTER ADAPTATIONS TO BRAZILIAN REALITY**

Original	Version translated into English after adaptations to the Brazilian context
1. A hypertensive patient had his blood pressure controlled with enalapril 2.5mg once daily. One dose was missed	A hypertensive patient had his blood pressure controlled with enalapril 5mg once daily. One dose was missed.
2. An elderly patient with a cardiac pacemaker was prescribed enteric coated aspirin 75mg once daily. One dose was omitted.	An elderly patient with a cardiac pacemaker was prescribed enteric coated acetylsalicylic acid (ASA) 100mg once daily. One dose was omitted.
3. A patient was prescribed lithium carbonate 600mg daily (one tablet) but was given a single dose of 1200mg (two tablets).	A patient was prescribed lithium carbonate 600mg daily (two 300mg tablets) but was given a single dose of 1200mg (four 300mg tablets).
4. The first two doses of chloramphenicol eye ointment, prescribed to be administered four times a day, were omitted in a patient with a suspected conjunctivitis.	The first two doses of chloramphenicol eye ointment, prescribed to be administered four times a day, were omitted in a patient with a suspected conjunctivitis.
5. An elderly patient with swallowing difficulties was prescribed ranitidine effervescent tablets 150mg twice daily, for the prophylaxis of ulceration while on diclofenac therapy. An ordinary non-soluble ranitidine tablet was given instead, which the patient swallowed with some difficulty.	An elderly patient with swallowing difficulties was prescribed ranitidine effervescent tablets 150mg twice daily, for the prophylaxis of ulceration while on diclofenac therapy. An ordinary non-soluble ranitidine tablet was given instead, which the patient swallowed with some difficulty.
6. A patient had been receiving warfarin 5mg daily, which was stopped when her INR was found to be 5.4. However, for three days she continued to receive a daily dose of warfarin 5mg.	A patient had been receiving warfarin 5mg daily, which was stopped when her INR was found to be 5.4. However, for three days she continued to receive a daily dose of warfarin 5mg.
7. A patient was prescribed vitamin B compound strong tablets, two daily. One dose of only one tablet was given.	A patient was prescribed vitamin B compound strong tablets, two daily (high dosage of vitamin B compound). One dose of only one tablet was given.
8. A patient with oral Candida was prescribed fluconazole 50mg daily for one week. Fluconazole 200mg capsules were dispensed, which the patient received for the week's course.	A patient with oral <i>Candida</i> was prescribed fluconazole 50mg daily for one week. Fluconazole 150mg capsules were dispensed, which the patient received for the week's course.
9. A patient prescribed Lacrilube eye drops for her dry eyes was given instead one dose of 30ml lactulose orally.	A patient prescribed Lacrifilm® lubricating eye drops for her dry eyes was given instead one dose of 30ml lactulose orally.
10. A patient with an itchy rash was prescribed calamine lotion to be applied three times a day. The first five doses were omitted	A patient with an itchy rash was prescribed calamine lotion to be applied three times a day. The first five doses were omitted

11. A patient with a history of heart failure was administered a dose of oral atenolol 100mg which was intended for another patient	A patient with a history of heart failure was administered a dose of oral atenolol 100mg which was intended for another patient
12. A patient was prescribed six doses of oral folic acid (15mg three times a day) as rescue therapy following methotrexate treatment. The patient instead received six doses of folic acid 15mg.	A patient was prescribed six doses of oral folic acid (15mg three times a day) as rescue therapy following methotrexate treatment. The patient instead received six doses of folic acid 15mg.
13. An elderly patient prescribed oral co-amilorfruse 2.5/20 (Frumil LS) once a day, for the treatment of mild heart failure, was instead given a dose of co-amilorfruse 5/40 (Frumil).	An elderly patient prescribed 20mg furosemide once a day, for the treatment of mild heart failure, was instead given a dose of 40mg furosemide
14. A patient was prescribed soluble insulin 10 units every six hours. This was initially interpreted as 10ml (1000 units), but the mistake was realised and the injection stopped after 2ml (200 units) had been given.	A patient was prescribed soluble insulin 10 units every six hours. This was initially interpreted as 10ml (1000 units), but the mistake was realised, and the injection stopped after 2ml (200 units) had been given.
15. A patient prescribed 5mg morphine IV was given intravenously 5mg of Oramorph (oral morphine solution 10mg/5ml) solution.	A patient prescribed 5mg morphine IV was given intravenously 5mg of Oramorph (oral morphine solution (Dimorf® 10mg/ml).
16. A patient was being treated for acute sciatica by lumbar epidural injection of methylprednisolone acetate. The vial of drug was reconstituted with 30% sodium chloride instead of 0.9% sodium chloride and then administered.	A patient was being treated for acute sciatica by lumbar epidural injection of methylprednisolone acetate. The vial of drug was reconstituted with 20% sodium chloride instead of 0.9% sodium chloride and then administered.
17. A patient with chronic obstructive airways disease was prescribed Augmentin 250/62 suspension, 5ml three times daily for the treatment of a chest infection. The first five doses were omitted.	A patient with chronic obstructive airways disease was prescribed Clavulin® (amoxicillin and potassium clavulanate 250/62) suspension, 5ml three times daily for the treatment of a chest infection. The first five doses were omitted.
18. One 10pm dose of oral metronidazole 400mg was omitted in a patient receiving the drug three times daily for surgical prophylaxis. He was three days post surgery.	One 10pm dose of oral metronidazole 400mg was omitted in a patient receiving the drug three times daily for surgical prophylaxis. He was three days post-surgery.
19. A patient with a known penicillin allergy was prescribed oral ciprofloxacin 500mg twice a day for the treatment of a chest infection. He was given one dose of flucloxacillin 500mg.	A patient with a known penicillin allergy was prescribed oral ciprofloxacin 500mg twice a day for the treatment of a chest infection. He was given one dose of oxacillin 500mg.
20. A patient was prescribed 100mg lamotrigine daily. Lamotrigine 100mg tablets were dispensed instead of the 25mg tablets intended. The patient therefore received 400mg daily for six days instead of 100mg daily.	A patient was prescribed 100mg lamotrigine daily. Lamotrigine 100mg tablets were dispensed instead of the 25mg tablets intended. The patient therefore received 400mg daily for six days instead of 100mg daily.

21. One dose of oral hydrocortisone 10mg was omitted in a patient with chronic adrenal insufficiency who was prescribed 20mg every morning and 10mg every evening.	One dose of oral hydrocortisone 10mg was omitted in a patient with chronic adrenal insufficiency who was prescribed 20mg every morning and 10mg every evening.
22. An elderly patient prescribed paracetamol suspension 250mg/5ml in a dose of 10ml (500mg) every six hours was given one dose of 20ml (1g).	An elderly patient prescribed paracetamol suspension 100mg/ml in a 5ml (500mg) dose every six hours was given one 10ml (1g) dose.
23. One dose of oral metformin 500mg was omitted in a diabetic patient receiving 500mg three times daily.	One dose of oral metformin 500mg was omitted in a diabetic patient receiving 500mg three times daily.
24. A patient prescribed 10ml of morphine elixir 2.5mg/5ml (5mg morphine) was given instead a dose of 10ml of the concentrated elixir 100mg/5ml (200mg morphine).	A patient prescribed 2ml of morphine IV (1mg/ml vials, with 2mg morphine content) was given instead a 20ml (200mg de morphine) dose from an IV 10mg/ml vial.
25. A patient was receiving oral ranitidine 150mg twice a day as prophylaxis against peptic ulceration, while he was also receiving steroids. One evening dose of the ranitidine was missed. He had no history of peptic ulceration.	A patient was receiving oral ranitidine 150mg twice a day as prophylaxis against peptic ulceration, while he was also receiving steroids. One evening dose of the ranitidine was missed. He had no history of peptic ulceration.
26. A patient was prescribed oral vancomycin 125mg four times a day for the treatment of Clostridium difficile colitis. Three days into therapy, two consecutive doses were omitted.	A patient was prescribed oral vancomycin 125mg four times a day for the treatment of Clostridium difficile colitis. Three days into therapy, two consecutive doses were omitted.
27. A patient with long standing Parkinson's disease was prescribed co-beneldopa 250mg (benserazide 50mg and levodopa 200mg) four times a day, but was dispensed a week's supply of modified release co-careldopa 250mg (carbidopa 50mg and levodopa 200mg) in a bottle labelled co-beneldopa.	A patient with long standing Parkinson's disease was prescribed Prolopa® 250mg (Benserazide 50mg and Levodopa 200mg) four times a day but was dispensed a week's supply of Cronomet® 250mg (Carbidopa 50mg and levodopa 200mg) in a bottle labelled Prolopa®.
28. A patient with Crohn's disease was prescribed prednisolone enteric coated tablets 5mg once daily, but was given plain uncoated 5mg prednisolone tablets throughout his four day hospital stay.	A patient with Crohn's disease was prescribed prednisolone enteric coated tablets 5mg once daily but was given plain uncoated 5mg prednisolone tablets throughout his four-day hospital stay.
29. An elderly patient was prescribed oral ranitidine 150mg twice a day as prophylaxis against NSAID-induced ulceration. The first six doses were omitted.	An elderly patient was prescribed oral ranitidine 150mg twice a day as prophylaxis against NSAID-induced ulceration. The first six doses were omitted.
30. A patient prescribed oral penicillin 250mg four times daily was dispensed penicillamine 250mg, which the patient was given for three days before the error was discovered.	A patient prescribed oral penicillin 250mg four times daily was dispensed penicillamine 250mg, which the patient was given for three days before the error was discovered.

31. One dose of oral diltiazem 60mg was omitted in a newly admitted patient with angina who normally took the drug three times a day.	One dose of oral diltiazem 60mg was omitted in a newly admitted patient with angina who normally took the drug three times a day.
32. A newly diagnosed asthmatic patient was prescribed beclomethasone 100 mcg per metered dose, two puffs twice a day. He was given an inhaler containing 250mcg beclomethasone per metered dose, containing sufficient quantity for three weeks.	A newly diagnosed asthmatic patient was prescribed beclomethasone 100 mcg per metered dose, two puffs twice a day. He was given an inhaler containing 250mcg beclomethasone per metered dose, containing sufficient quantity for three weeks.
33. A patient written up for warfarin 10mg was given two 5mg tablets that had expired one month previously.	A patient written up for warfarin 10mg was given two 5mg tablets that had expired one month earlier.
34. A patient was prescribed thyroxine 25 microgrammes daily. The patient was instead administered methotrexate 25mg daily for several days.	A patient was prescribed thyroxine 25 micrograms daily. The patient was instead administered methotrexate 25mg daily for several days.
35. An elderly patient prescribed digoxin elixir 125 micrograms daily for the treatment of chronic atrial fibrillation was given 50 micrograms of the elixir daily for several weeks.	An elderly patient prescribed digoxin elixir 125 micrograms daily for the treatment of chronic atrial fibrillation was given 50 micrograms of the elixir daily for several weeks.
36. A terminally ill patient was prescribed morphine sulphate SR tablets 60mg twice daily. He was given a dose of 60mg Sevredol (non-modified release morphine sulphate) rather than the intended MST tablets.	A terminally ill patient was prescribed morphine sulphate SR tablets 60mg (DIMORF® LC) twice daily. He was given a dose of 60mg (two 30mg tablets) non-modified release morphine sulphate rather than the intended DIMORF® LC (CR).
37. A patient prescribed vancomycin 1g IV twice daily was given one of the doses as a bolus rather than by infusion.	A patient prescribed vancomycin 1g IV daily was given one of the doses as direct IV (bolus) rather than by intermittent infusion.
38. A patient was prescribed gentamicin ear drops, two drops three times a day to the right ear, for the treatment of an ear infection shown to be sensitive to gentamicin. On the second day of treatment, one dose was administered to the left ear instead of the right ear.	A patient was prescribed gentamicin ear drops, two drops three times a day to the right ear, for the treatment of an ear infection shown to be sensitive to gentamicin. On the second day of treatment, one dose was administered to the left ear instead of the right ear.
39. The first two doses of topical Teejel (choline salicylate dental gel BP), prescribed to be applied four times daily, were omitted in a patient with mouth ulcers.	The first two doses of OMCILON-A ORABASE (Triamcinolone acetonide), prescribed to be applied four times daily, were omitted in a patient with mouth ulcers.
40. A patient prescribed cefotaxime 1g IV three times a day for post-partum pyrexia had a dose reconstituted with 10ml of 15% potassium chloride solution instead of 0.9% sodium chloride. The dose was then administered by bolus injection.	A patient prescribed cefotaxime 1g IV three times a day for post-partum pyrexia had a dose reconstituted with 10ml of 19% potassium chloride solution instead of 0.9% sodium chloride. The dose was then administered by bolus injection.

41. An elderly non-diabetic patient was given another patient's 5mg glibenclamide tablet.	An elderly non-diabetic patient was given another patient's 5mg Glibenclamide tablet.
42. An elderly patient with cellulitis was prescribed oral flucloxacillin 1g four times daily. One week after the start of the treatment she was given two consecutive doses of 500mg instead of 1g.	An elderly patient with cellulitis was prescribed oral dicloxacillin 500mg four times daily. One week after the start of the treatment the patient was given two consecutive doses of 250mg instead of one 500mg dose.
43. An elderly patient with a hospital-acquired chest infection was prescribed cefotaxime 1g IV three times a day. Two days into the treatment course he was given one oral dose of cephadrine 500mg instead of the dose prescribed. He was able to swallow oral medication.	An elderly patient with a hospital-acquired chest infection was prescribed cefotaxime 1g IV three times a day. Two days into the treatment course he was given one oral dose of Cephalexin 500mg instead of the dose prescribed. He was able to swallow the oral medication.
44. One dose of salbutamol 400mcg rotacaps was omitted in a patient with chronic obstructive airways disease.	One dose of salbutamol 100mcg rotacaps was omitted in a patient with chronic obstructive airways disease.
45. A patient stabilised on warfarin 5mg daily was given one dose of 7.5mg.	A patient stabilised on warfarin 5mg daily was given one dose of 7.5mg.
46. A patient who was prescribed oral diltiazem 60mg three times a day was given instead one dose of diazepam 60mg.	A patient who was prescribed oral diltiazem 60mg three times a day was given instead one dose of diazepam 60mg.
47. A patient prescribed oral diclofenac 50mg three times a day for post-operative pain control missed the first three doses.	A patient prescribed oral diclofenac 50mg three times a day for post-operative pain control missed the first three doses.
48. A patient with oesophagitis was prescribed omeprazole (Losec) 20mg daily. For three days the patient instead received frusemide (Lasix) 20mg.	A patient with oesophagitis was prescribed omeprazole (Losec®) 20mg daily. For three days the patient instead received frusemide (Lasix®) 20mg.
49. A patient with anaemia was prescribed oral ferrous sulphate 200mg three times a day. One dose was omitted.	A patient with anaemia was prescribed oral ferrous sulphate 200mg three times a day. One dose was omitted.
50. A patient prescribed Augmentin (co-amoxiclav 250/125), one tablet three times a day for a chest infection, was given one dose of two tablets on the third day of therapy. Her renal function was normal.	A patient prescribed Clavulin® (Amoxicillin/potassium clavulanate – 250/125) one tablet three times a day for a chest infection, was given one dose of two tablets on the third day of therapy. Her renal function was normal.

**APPENDIX B - MEAN SCORE BASED ON ASSESSEMENT OF 30 JUDGES FOR EACH MEDICATION ADMINISTRATION ERROR**

<b>ERROR</b>	<b>MEAN SCORE</b>
1	3.3
2	3
3	5.3
4	4.2
5	4.7
6	7.8
7	2.1
8	5
9	3
10	3.2
11	6.3
12	4.5
13	4.5
14	8.8
15	7.9
16	8.5
17	6.8
18	2.9
19	7.3
20	7.2
21	4.2
22	4.2
23	3.3
24	9.1
25	2.3
26	4.9
27	3.5
28	4.4
29	4.8
30	6.9
31	5.1
32	4.5
33	3.1
34	7.5
35	6.9
36	5.2
37	7
38	3.3
39	3.1
40	9.3
41	5.6
42	2.0
43	3.8
44	3.5
45	4.6
46	7.5
47	4.1
48	5.3
49	1.6
50	2.5

**APPENDIX C.** Crossed design study with 30 participants on two separate occasions

<b>G STUDY</b>		
<b>Sources of Variation</b>	<b>Estimated variance</b>	<b>Percentage of total variance</b>
Case	5.906	52.9
Judge	0.000	0.0
Occasion	0.000	0.0
Case x Judge	0.131	1.2
Case x Occasion	0.000	0.0
Judge x Occasion	1.610	14.4
Residual	3.518	31.5
<b>D STUDY</b>		
Case	0.591	37.3
Judge	0.000	0.0
Occasion	0.000	0.0
Case x Judge	0.013	0.8
Case x Occasion	0.000	0.0
Judge x Occasion	0.805	50.8
Residual	0.176	11.1
<b>G coefficients</b>		
$\rho$	0.99	
$\Phi$	0.98	

*Source: the author, 2022.*

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

**APPENDIX D.** G coefficient estimates to maximize scale reliability of future studies (doctors)

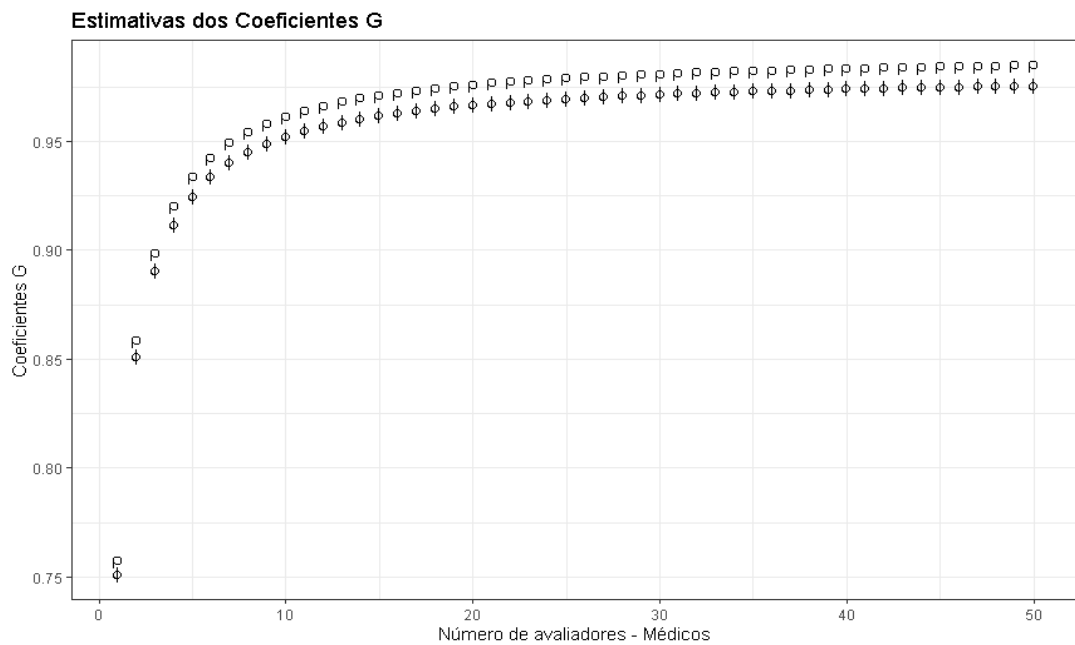
Number of judges	G coefficients	
	$\rho$	$\Phi$
1	0.76	0.75
2	0.86	0.85
3	0.90	0.89
4	0.92	0.91
5	0.93	0.92
6	0.94	0.93
9	0.96	0.95
12	0.97	0.96
15	0.97	0.96
18	0.97	0.96
21	0.97	0.97

Source: The author, 2022.

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.



## G coefficient estimates to maximize scale reliability of future studies (doctors)



Source: The author, 2022.

Embedded text:

G coefficients/ G coefficient estimates/ number of judges – doctors

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

**APPENDIX E.** G coefficient estimates to maximize scale reliability of future studies (pharmacists)

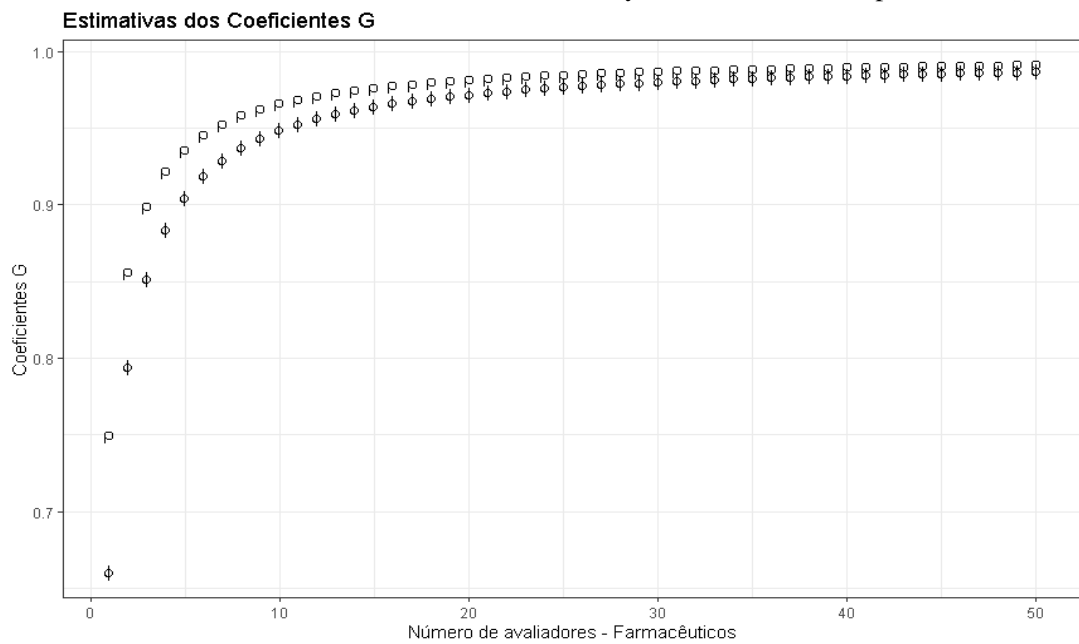
Number of judges	G coefficients	
	$\rho$	$\phi$
1	0.75	0.66
2	0.85	0.79
3	0.90	0.85
4	0.92	0.88
5	0.93	0.90
6	0.94	0.91
9	0.96	0.94
12	0.97	0.96
15	0.97	0.96
18	0.98	0.97
21	0.98	0.97

Source: The author, 2022.

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.

$\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

## G coefficient estimates to maximize scale reliability of future studies (pharmacists)



Source: The author, 2022.

Embedded text:

G coefficients/ G coefficient estimates/ number of judges – pharmacists

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

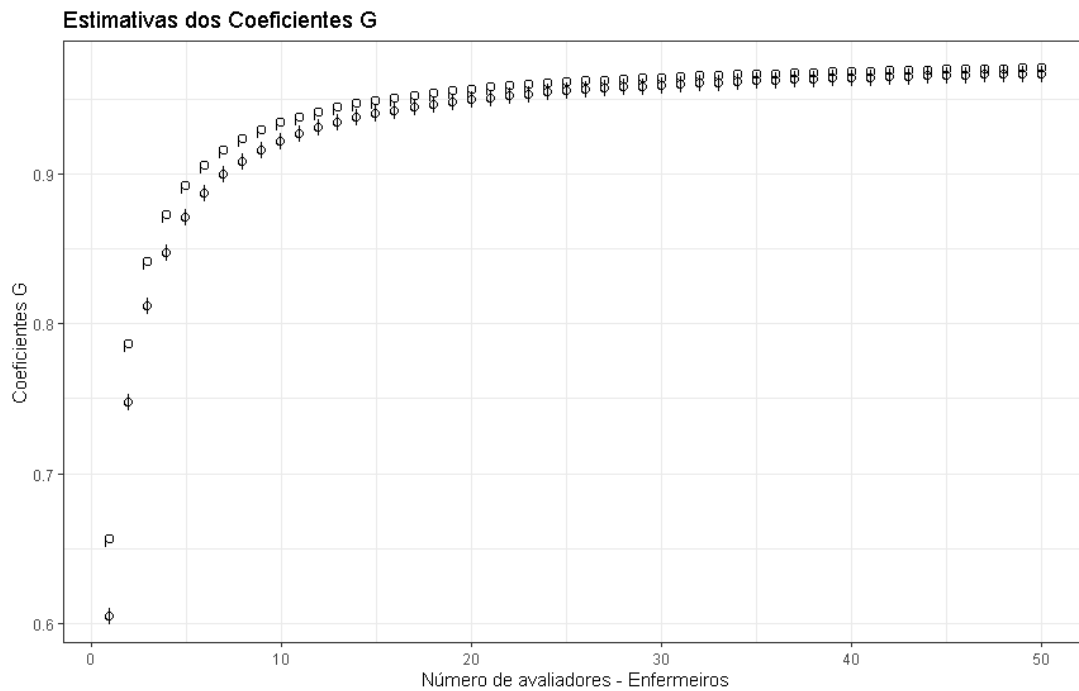
**APPENDIX F.** G coefficient estimates to maximize scale reliability of future studies (nurses)

Number of judges	G coefficients	
	$\rho$	$\Phi$
1	0.66	0.60
2	0.79	0.75
3	0.84	0.81
4	0.87	0.85
5	0.89	0.87
6	0.90	0.89
9	0.93	0.92
12	0.94	0.93
15	0.95	0.94
18	0.95	0.95
21	0.96	0.95

Source: The author, 2022.

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

## G coefficient estimates to maximize scale reliability of future studies (nurses)



Source: The author, 2022.

Embedded text:

G coefficients/ G coefficient estimates/ number of judges – nurses

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

**APPENDIX G. Generalizability study (Doctors, Pharmacists, Nurses) APÊNDICE**

<b>G STUDY</b>		
<b>Sources of Variation</b>	<b>Estimated variance</b>	<b>Percentage of total variance</b>
Case	3.923	41.7
Profession	0.434	4.6
Case x Profession	0.245	2.6
Judge: Profession	1.305	13.8
Residual	3.517	37.3
<b>D STUDY</b>		
Case	0.078	12.0
Profession	0.434	66.3
Case x Profession	0.005	0.7
Judge: Profession	0.130	19.9
Residual	0.007	1.1
<b>G coefficients</b>		
P	0.97	
$\Phi$	0.98	

Source: The author, 2022. Note: The symbol "x" indicates cross.

( $\rho$ )- letter phi has more contributions to the variance; it is a more conservative coefficient, thus representing how generalizable the instrument is to different samples in other contexts.  $\phi$  (Greek letter rho) represents how generalizable the instrument is to the sample, considering the relative differentiation between the elements of the object of study in a given sample.

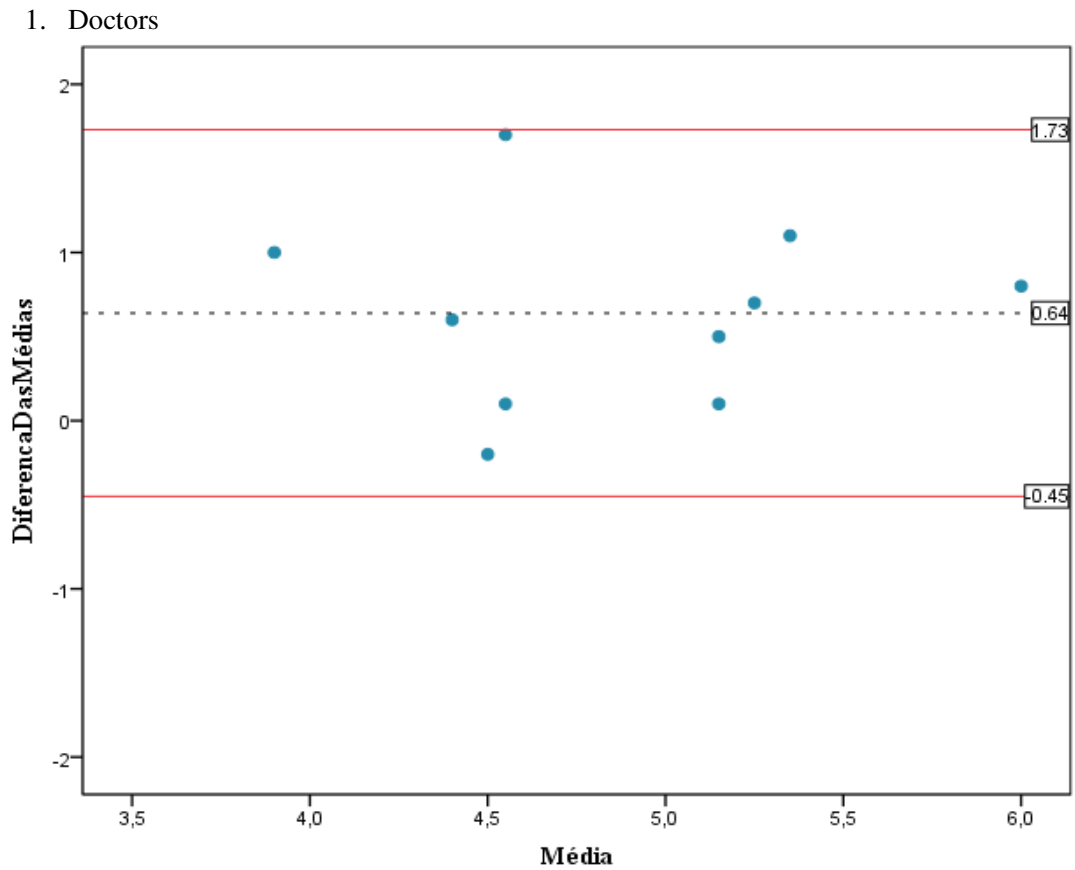
**APPENDIX H.** G coefficients for a varied number of judges representing different professions

<b>Scenario</b>	<b>G coefficient</b>
1 judge from every two professions (2 judges in total)	0.85
1 judge from each profession (3 judges in total)	0.89
2 judges from every 2 professions (4 judges in total)	0.88
2 judges from every 3 professions (6 judges in total)	0.93

**APPENDIX I.** Cases of overlapped scores

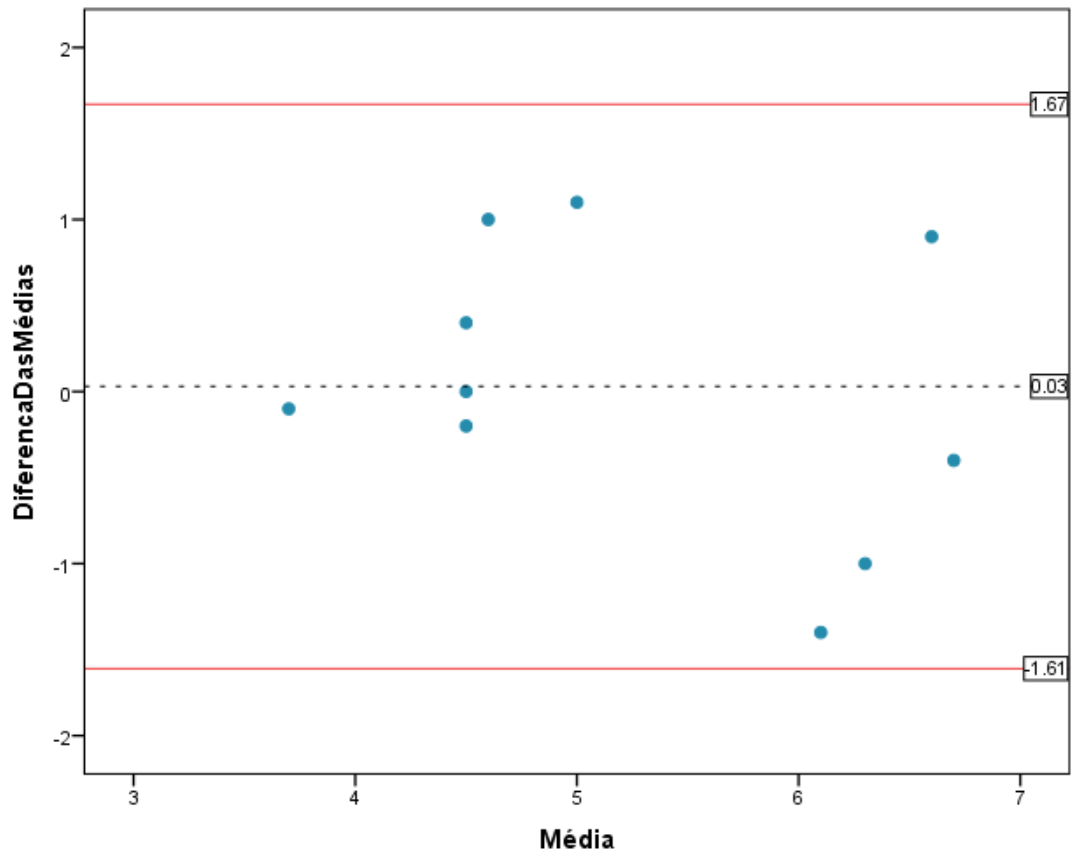
<b>Case #</b>	<b>Description</b>	<b>Cases with previously known score</b>	<b>Mean assigned score</b>
5	An older patient facing difficulties in swallowing was prescribed effervescent ranitidine 150 mg twice daily for ulceration prophylaxis during continuous diclofenac therapy. A common non-soluble ranitidine tablet was administered, which the patient swallowed with some difficulty.	2.6	4.8
11	A patient with a history of heart failure was given a 100 mg oral dose of atenolol that was intended for another patient.	7.1	6.3
15	A patient prescribed 5 mg of IV morphine, received 5 mg of oral morphine solution intravenously (Dimorf® 10 mg/ml).	6.5	7.9
22	An older patient was prescribed paracetamol oral suspension (100 mg/ml) at a dose of 5 ml (500 mg) every six hours. A dose of 10 ml (1g) was administered.	1.5	4.1



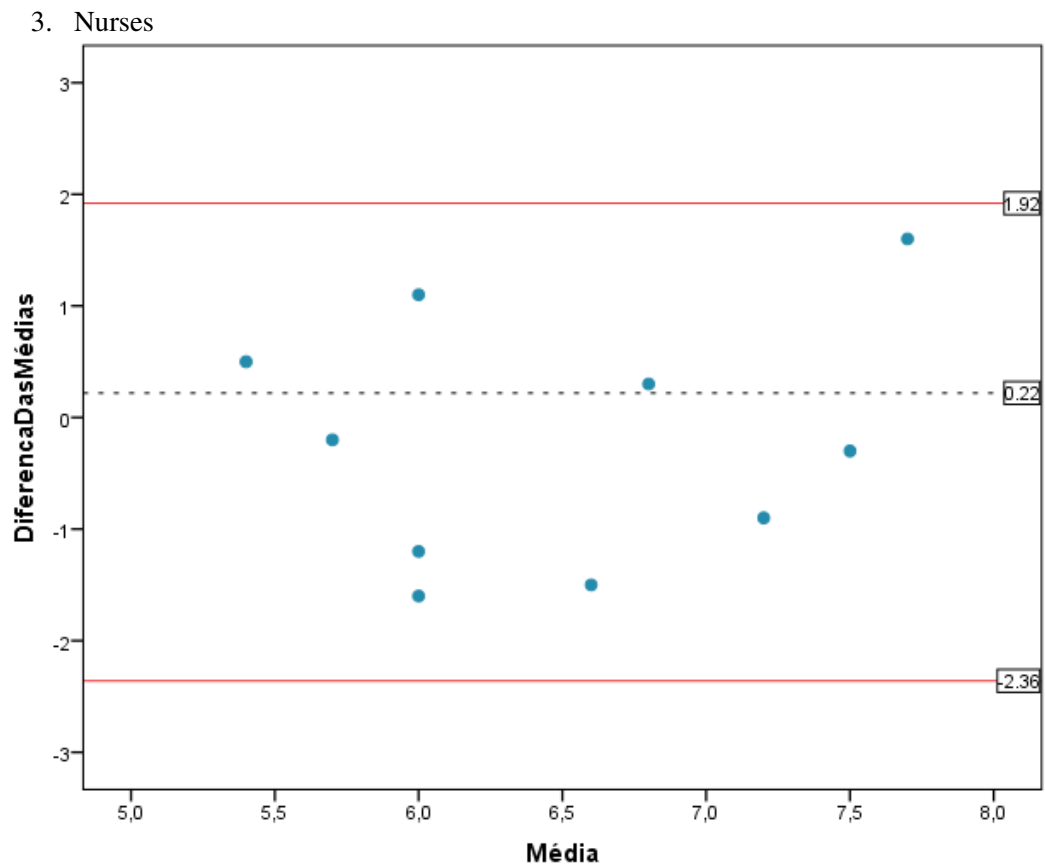
**APPENDIX J. Bland-Altman plot**

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## 2. Pharmacists



Embedded text: Variations between means/mean



Embedded text: Variations between means/mean

### FIGURE LENGENDS

**Figure 1.** G coefficient estimates to maximize protocol reliability of future studies (doctors, pharmacists and nurses)

**Figure 2.** Comparing the judges' mean scores and the actual outcome severity

**Figure 3.** Mean score comparison of Brazil, Germany and the UK