

Antibiotic Consumption in a Healthcare System in Bolivia During the First Wave of the COVID-19 Pandemic

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BACKGROUND

- Several countries in Latin America reported an increase in antibiotic use during the first wave of the COVID-19 pandemic
- In April 2020, the antibiotic stewardship (AS) team developed COVID-19 treatment guidelines for ambulatory and hospitalized patients which were disseminated within the healthcare system
- Additionally, the AS team provided followed all COVID-19 inpatients

OBJECTIVE

- To compare antibiotic consumption between pre-pandemic period and the first wave of the COVID-19 pandemic in a private healthcare system in Bolivia

METHODS

- We retrospectively evaluated outpatient and inpatient antibiotic use in a large private healthcare system in Santa Cruz de la Sierra, Bolivia, between Jan-Dec 2019 (pre-pandemic) and Jan-Aug 2020 (pandemic)
- We calculated defined daily doses (DDD) per 1,000 member-days, per 100 ambulatory visits, and per 100 inpatient-days
- Antibiotics were categorized using the World Health Organization classification (*Access*, *Watch*, and *Reserve*)
- During the pandemic period and due to local restrictions, patient interactions and hospitalizations were mostly limited to COVID-19 cases

RESULTS

- Overall pandemic and pre-pandemic antibiotic consumption in DDD/1,000 member-days was 8.48 and 18.37, respectively (diff. -9.89, CI 95% -10.11 to -9.67) (**Table 1**)
- DDD/100 ambulatory visits was 67.68 vs. 86.20 (diff. -18.52, 95% CI -19.94 to -17.10), and hospital DDD/per 100 inpatient-days was 39.79 vs. 61.71 (diff. -21.92, 95% CI -26.20 to -17.68) for pandemic and pre-pandemic periods, respectively (**Table 2**)
- During the pandemic period, an overall reduction in macrolides use was also observed (-2.09 DDD/1,000 member-days, 95% CI -2.20 to -1.99, -3.13 DDD/100 ambulatory visits, 95% CI -3.84 to -2.44, and -2.05 DDD/per 100 inpatient-days, 95% CI -2.88 to -1.26) (**Figure**)
- Additionally, an increase in "access" antimicrobials (83.3% vs. 79.5%; diff. 3.8%, 95% CI 0.3% to 7.4%) and a reduction in the "watch" group (16.7% vs. 20.5%; diff. -3.7%, 95% CI -7.4% to -0.1%) were observed for pandemic and pre-pandemic periods, respectively (**Table 3**)

RESULTS

Table 1. Comparison of antibiotic consumption between pandemic and pre-pandemic period

Antibiotic group*	DDD per 1,000 member-days				p
	Jan-Dec 2019 (pre-pandemic)	Jan-Aug 2020 (pandemic)	Difference (pandemic vs pre-pandemic)	95% CI	
1G Cephalosporins	0,52	0,28	-0,24	-0,29 to -0,21	0,0000
Penicillins + beta-lactamase inhibitors	7,50	2,99	-4,51	-4,64 to -4,37	0,0000
Beta-lactamase sensitive penicillins	0,16	0,05	-0,11	-0,13 to -0,09	0,0000
Aminoglycosides	0,17	0,09	-0,08	-0,09 to -0,05	0,0000
3G Cephalosporins	1,58	0,83	-0,75	-0,81 to -0,68	0,0000
Macrolides	4,13	2,04	-2,09	-2,20 to -1,99	0,0000
Lincosamides	0,08	0,04	-0,04	-0,05 to -0,02	0,0000
Fluoroquinolones	1,02	0,66	-0,36	-0,42 to -0,30	0,0000
Sulfamethoxazole+trimethoprim	0,87	0,31	-0,56	-0,61 to -0,52	0,0000
Carbapenems	0,02	0,01	-0,01	-0,02 to -0,01	0,0035
Penicillins with extended spectrum	1,20	0,52	-0,68	-0,74 to -0,63	0,0000
Glycopeptides	0,01	0,00	-0,01	-0,02 to -0,01	0,0011
4G Cephalosporins	0,01	0,00	-0,01	-0,02 to -0,01	0,0000
Nitrofurantoin	0,43	0,23	-0,20	-0,23 to -0,16	0,0000
Tetracyclines	0,60	0,39	-0,21	-0,25 to -0,16	0,0000
Beta-lactamase resistant penicillins	0,06	0,04	-0,02	-0,03 to -0,01	0,0031
Total	18,37	8,48	-9,89	-10,11 to -9,67	0,0000

References: *J01 group of ATC-WHO classification; 95% CI: 95% Confidence Interval; DDD: Defined Daily Doses

Table 2. Comparison of antibiotic consumption stratified by area of prescription between pandemic and pre-pandemic period

Ambulatory	# DDD		Ambulatory visits		DDD per 100 ambulatory visits		Difference (pandemic vs pre-pandemic)	95% CI	p
	2019	2020	2019	2020	2019	2020			
	43,840	12,934	50,859	19,111	86.20	67.68	-18.52	-19.94 to -17.10	0,0000
Inpatient	# DDD		Inpatient-days		DDD per 100 inpatient-days		Difference (pandemic vs pre-pandemic)	95% CI	p
	2019	2020	2019	2020	2019	2020			
	1,880	586	3,046	1,473	61.71	39.79	-21.92	-26.20 to -17.68	0,0000

References: 95% CI: 95% Confidence Interval; DDDs: Defined Daily Doses

Figure. Comparison of macrolides consumption between pandemic and pre-pandemic period in ambulatory (*-3.13, 95% CI -3.84 to -2.44, p<0.0000), and in inpatient area (**-2.05, 95% CI -2.88 to -1.26, p<0.0000)

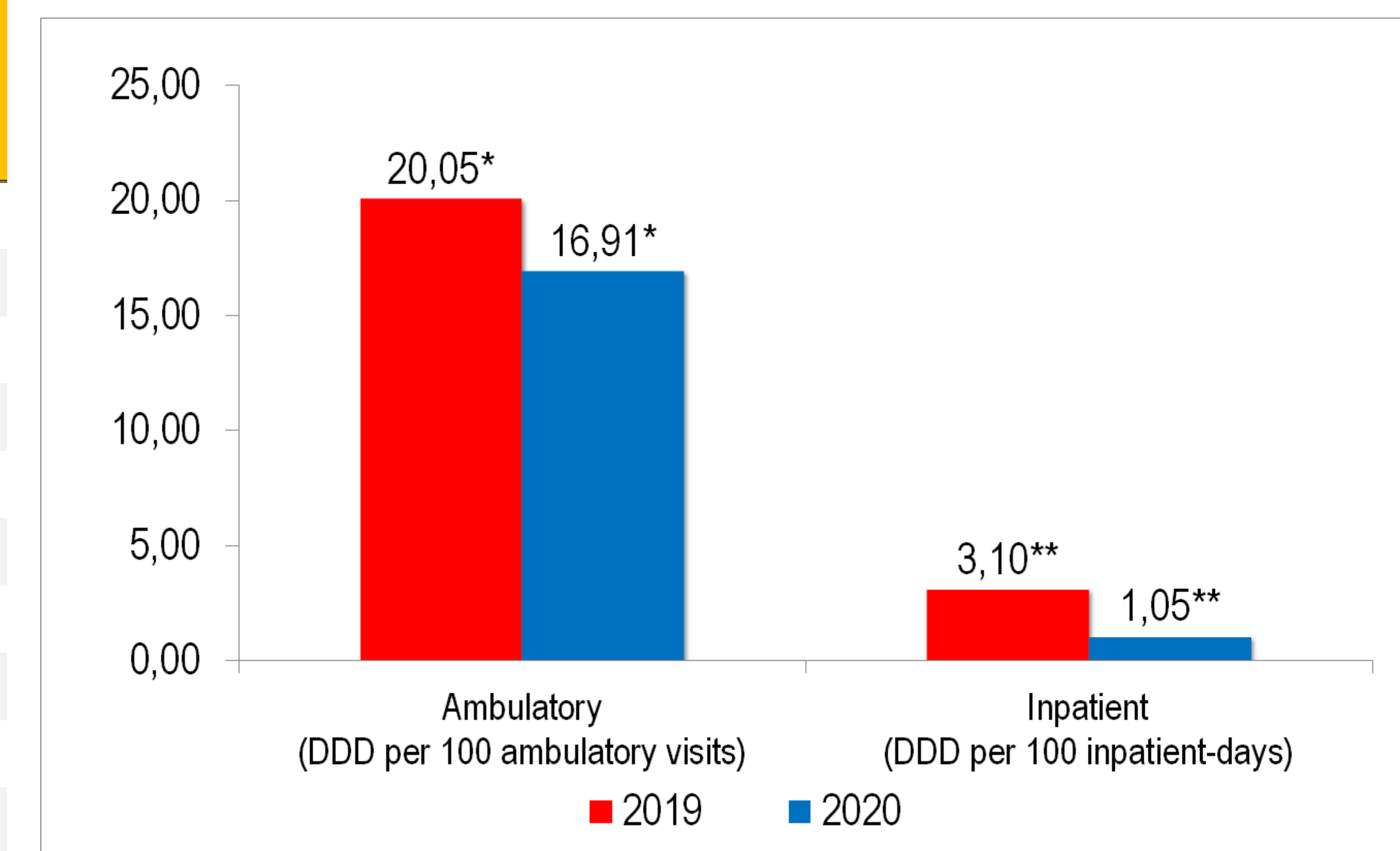


Table 3. Antibiotic consumption ("access" group) stratified by area between pandemic and pre pandemic period

Area	A/W		% of access		Difference	95% CI	P
	2019	2020	2019	2020			
Ambulatory	1.55	1.20	60.8%	54.4%	-6.34%	7.3% to -5.4%	NS
Inpatient	3.88	4.97	79.5%	83.3%	3.80%	0.3% to 7.4%	0.0000

References: AWaRe WHO classification (*Access*, *Watch*, and *Reserve*); 95% CI: 95% Confidence Interval; A/W access/watch ratio

CONCLUSIONS

- In this closed health network, we observed a reduction in antibiotic consumption in both the ambulatory and inpatient settings during the pandemic
- We believe the early implementation of enhanced antibiotic stewardship for COVID-19 patients played a role in limiting antimicrobial use in this private healthcare system

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