

Antibiotic dispensing and over the counter drug sale: case study in “Villa” community pharmacy in Montenegro 2019-2021

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Introduction

COVID-19 pandemic impacted the humanity globally. At the beginning of the pandemic many factors were uncharted and hence people felt unsure in any circumstances, including medicine availability and usage. Reports are showing that along with promotion of restrictive measures for health protection there was anticipation for decreased supply of essential goods, including medicines (Karlsson et al, 2021). Due to the public anxiety generated with lockdowns and fear from unknown such as possible reduction of pharmaceutical industry manufacturing and medicine sale chain disruptions owing to quarantines, in some countries excessive medication purchasing and stockpiling were detected (Karlsson et al, 2021; Romano et al., 2020; Sulis et al., 2021). Community pharmacies as last link of drug supply chain that are in direct contact with patients are at the frontline when it comes to the detection of changes in medicine dispensing and over the counter drug (OTC) sales.

The aim of this study was to get insight into the antibiotic dispensing and OTC sales in community pharmacies in Montenegro in the period 2019-2021 and to see if there were any impending changes before and after declaration of COVID-19 pandemic. As this was preliminary indicative case-study the data were collected from single community pharmacy “Villa” located in city of Budva, Montenegro.

Materials and methods

Antibiotic dispensing was assessed for amoxicillin, amoxicillin+clavulonic acid, ciprofloxacin, cephalexin, cefixime, ceftriaxone and azithromycin, while OTC sale was assessed for paracetamol, ibuprofen and vitamin D. Data were aggregated quarterly for the period 2019-2021. The assessment of drug consumption was expressed as number of dispensed daily doses (NDDD) calculated as a ratio between total amounts (mg) of dispensed drugs and defined daily doses (DDD) (<https://www.whocc.no/>). As DDD are normally assigned based on use in adults, only solid dosage forms such as capsules and tablets were considered except for ceftriaxone which is available only in form of injections.

Liquid dosage forms usually prescribed and sold for pediatric use are not taken into consideration as according to WHO pediatric DDDs are challenging to assign and problems related to drug utilization research in children cannot be solved by such means (<https://www.who.int/tools/atc-ddd-toolkit/about-ddd>).

Results and discussion

Annual overall antibiotic utilization was 5654.83, 5102.67 and 7095.5 NDDD for 2019, 2020 and 2021 accordingly. The most dispensed antibiotic in 2019 was azithromycin with 1290 NDDD, while the least one was ceftriaxone with 73.5 NDDD. Ciprofloxacin was dispensed in 690, cefixime in 790, cefalexin in 940, amoxicillin+clavulanic acid in 928 and amoxicillin in 940 DDD. The quarterly NDDD of dispensed antibiotics were

1565.6, 1601.17, 1278.67 and 1209.33 for January-March, April-June, July-September and October-December 2019. In 2020 significant increase is noted in azithromycin (1650 NDDD) and ciprofloxacin (840 NDDD) dispensing. Some rise of ceftriaxone dispensing is also present (85 NDDD). On the other hand, all other antibiotic dispensing was lower in 2020 when compared to 2019, cefixime - 450, cefalexin -684, amoxicillin+clavulanic acid -788.67 and amoxicillin- 608 NDDD. The quarterly data for 2020 showed that most antibiotics were dispensed in last quarter (October-December) 2090.5, followed by first quarter (January-March)-1287.5, third quarter (July-September) 1081.5 and second quarter (April-June) 643.17 NDDD. These observations are most likely associated with COVID-19 peaks but also with winter seasons when common cold and similar ailments are usual. As it was already noted in 2021 significant increase of dispensed antibiotics was recorded when compared to previous 2020 and 2019. Significance was detected in cases of azithromycin (1930 NDDD), ciprofloxacin (1532.5 NDDD), cefixime (950 NDDD) and ceftriaxone (944.5 NDDD). Decreased dispensing in 2020 was observed for cephalexin (564 NDDD), amoxicillin (576 NDDD) and amoxicillin+clavulanic acid (598.5 NDDD). The quarterly data for annual antibiotic dispensing in 2021 were as follows 3123.17 NDDD in January-March, 1155.83 NDDD in April-June, 1915.17 NDDD in July-September and 901.17 NDDD in October-December thus associating with COVID-19 peaks in 2021 in Montenegro.

Paracetamol sale nearly doubled in 2021 (6676.67 NDDD) when compared to 2019 (3408 NDDD), while in 2020 it was 5558 DDD. In 2019 paracetamol most NDDD were sold in 3rd quarter (July-September) -1003.33 NDDD, in 2020 in 1st quarter (January-March) – 2297.33 NDDD and in 2021 also in 3rd quarter (July-September)– 2325.33 NDDD. Contrary to paracetamol a decrease of ibuprofen sale was determined in the period 2019-2021. In 2019 a total of 18983.33 NDDD of ibuprofen were sold while in 2020 it decreased to 15031.67 NDDD and in 2021 it was 16420 NDDD. Most sold NDDD for ibuprofen in 2019 and 2020 were determined in the first quarter (January-March)-4838.33 and 4835 NDDD respectively, while in 2021 it was in 3rd quarter (July-September) with 5031.67 NDDD. Vitamin D sale increased after COVID-19 declaration with a paramount surge after I-MASK+ Prevention & Early Outpatient Treatment Protocol for COVID-19 announcement in October 2020 (<https://covid19criticalcare.com/covid-19-protocols/i-mask-plus-protocol/>).

Namely in 2019 only 27.5 NDDD of Vitamin D were sold, while in 2020 and 2021 - 428.75 and 622.5 NDDD were sold accordingly. In 2020 the most sold NDDD (301.25) were recorded in the last quarter (October-

December), while in 2021 in 1st quarter (January-March) – 393.75 NDDD of vitamin D.

Conclusion

Overall antibiotic dispensing increased nearly 25% in 2021 compared to 2019. The highest increase was observed in ceftriaxone dispensing, 12.85 times higher followed by ciprofloxacin – 2.2 times, azithromycin – 1.5 times and cefixime 1.2 times in 2021 vs 2019. Paracetamol sales increased for 96%, while ibuprofen sales decreased for 14% in 2021 when compared to 2019. Vitamin D sales increased 22.6 times in 2021 compared to 2019 and 45.2% in 2021 paralleled to 2020. Overall results indicated that there were notable changes in antibiotic dispensing an over the counter drug sale before and after declaration of COVID-19 pandemic.

References

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