

ORIGINAL ARTICLE

Telepharmacy service experience during the COVID-19 pandemic in the Republic of Srpska, Bosnia and Herzegovina

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Funding information

This research was funded by the Ministry of Education, Science and Technological Development, Republic of Serbia through Grant Agreement with University of Belgrade-Faculty of Pharmacy No: 451-03-9/2021-14/200161.

Abstract

The COVID-19 pandemic exerted a profound impact on health systems worldwide. Moreover, significant concerns were raised in terms of middle- and long-term consequences of postponing care in non-COVID patients. The primary aim of the study was to describe the remote pharmaceutical care service (telepharmacy) during the COVID-19 pandemic in the Republic of Srpska (RS), Bosnia and Herzegovina. The secondary aim was to identify service users' needs and concerns and to describe community pharmacists' interventions. Ten community pharmacists were appointed by the Pharmaceutical Society of the RS to deliver telepharmacy services. After obtaining users' verbal permission, pharmacists documented issues discussed with them. The prospective data collection included the period from April 13 to May 21, 2020. Descriptive and statistical analysis was performed using IBM SPSS Statistics software (ver. 22). A total of 71 service users' charts were analyzed. Telepharmacy users were on average 61.31 ± 13.27 years of age, with almost equal gender distribution. Patients with chronic or acute/subacute conditions were predominant with a share of 84.5%. Chronic diseases were the main reason for searching pharmacists' consultation (74.6%), 7% had a complaint about worsening of a chronic condition, 9.9% reported only acute/subacute conditions as ambulatory conditions, whereas 15.5% asked information about coronavirus or COVID-19. The vast majority of patients' and users' needs were addressed by a pharmacist during counseling and only 15.5% of the patients required immediate referral to a doctor for refill/prescribing purposes. Remote pharmaceutical care service (telepharmacy) is deemed a convenient model in the RS during the COVID-19 pandemic. Patients and users presented with explicit and specific needs and concerns, both COVID- and non-COVID-related, which should not be neglected. Community pharmacists showed a high level of resilience and ability in addressing patients' needs.

KEYWORDS

community pharmacy, COVID-19, pharmaceutical care, pharmacist, public health, telehealth

1 | INTRODUCTION

The COVID-19 pandemic exerted a profound impact and burden on health systems worldwide. To ensure the healthcare system can cope with the surge in health needs because of the pandemic, the health response was split into two sections, COVID and non-COVID. Nevertheless, COVID-centres took the primate in healthcare resources utilisation, both in terms of human resources and medication supplies. Therefore, significant concerns were raised in terms of middle- and long-term consequences of postponing care in chronic non-COVID patients (Domeyer et al., 2020; Mauro et al., 2020). There is a major concern that the suspension of caring for a chronic disease could cause a marked rise in hospital admissions and related healthcare costs, further increasing the burden on health systems irrespective of the chronic disease impact on COVID-19 outcomes (Domeyer et al., 2020; Yang et al., 2020). In a recently published study, general practitioners reported a decrease in the number of regular consultations with chronic patients by 70%–80%, with similar findings observed for acute problems in European primary care settings (Verhoeven et al., 2020). The observed decrease in physician-patient consultations could be explained by two main reasons: patient's fear of getting infected or physician's overload with respiratory symptoms assessment and triage (Verhoeven et al., 2020). Community pharmacists are the most accessible healthcare professionals (Todd et al., 2014), proving their indispensable role in health systems, both in regard to COVID-19 pandemic control and regular pharmaceutical care services to patients and users. Many studies have described new and emerging roles during the COVID-19 pandemic, as well as reassured community pharmacists' considerable impact on chronic disease management. The majority of recommendations for providing pharmaceutical care during the COVID-19 pandemic come from China; nevertheless, scientific publications also provide insight into the situation in the pharmacy sector in Macau, Nigeria, Saudi Arabia, United Arab Emirates, India, Ghana, Egypt, and Canada (Arain et al., 2021; Austin & Gregory, 2021; Bahlol & Dewey, 2021; Basu, 2020; Hedima et al., 2021; Ibrahim et al., 2020; Kretchy et al., 2021; Li et al., 2021; Liu et al., 2020; Meghana et al., 2021; Mohamed Ibrahim et al., 2021; Ung, 2020; Zheng et al., 2021). The increase of interest in research and publishing of pharmaceutical care services is driven by the urge of reflecting and defining pharmacists' roles to best respond to the pandemic outbreak which has no predictable end time. Moreover, the experience gained during this pandemic would be beneficial for pharmacy practice resilience in future emergencies (Austin & Gregory, 2021).

Merks et al. provided a detailed review of the legal extension of the pharmacists' role in light of the COVID-19 pandemic in European countries, Canada, and the United States (Merks et al., 2021). The review summarised that many countries have facilitated remote pharmaceutical care services, such as Internet services, virtual medical consultations, e-prescriptions and home drug delivery, to promote social distancing between patients and healthcare providers (Merks et al., 2021). Telepharmacy is defined as 'the provision of pharmaceutical care to patients at a distance, through the

What is known about this topic

- The COVID-19 pandemic exerted a profound impact and burden on health systems worldwide.
- Significant concerns were raised in terms of middle- and long-term consequences of postponing care in chronic non-COVID patients.

What this paper adds

- Telepharmacy service study demonstrated that a heterogeneous group of patients and service users may benefit from remote pharmaceutical care activities.
- Patients and users presented with explicit and specific needs and concerns, both COVID- and non-COVID-related, which should not be neglected.
- Community pharmacists showed a high level of resilience and ability in addressing patients' needs.

use of telecommunication and information technologies' (Casey et al., 2010; Win, 2017). It was developed to serve patients in rural areas with healthcare shortages, and it reaches its maximum use in the time of pandemics (Le et al., 2020). A large-scale study from the United Arab Emirates included 52 community pharmacies and demonstrated the capacity of telepharmacy to reduce the burden on the health care systems (Mohamed Ibrahim et al., 2021). Besides policies overview, so far no results on telepharmacy experience were published from the European community pharmacy settings. The Republic of Srpska (RS) is one of the two constituent entities of Bosnia and Herzegovina, with an estimated population of ~1 million. Upon the declaration of a national emergency state in RS on March 28, 2020, different measures were employed ranging from restricting population movement and increasing social distancing to implementing voluntary or enforced isolation, similarly to most of the European countries (Fong et al., 2020). At the beginning of the COVID-19 pandemic in RS, curfew measures were primarily directed to elderly chronic patients, as the most vulnerable part of the population (The National Assembly of the Republic of Srpska, 2020). In line with that, the local government office in collaboration with the Pharmaceutical Society of RS issued a public call toward community pharmacies on March 26 (The Pharmaceutical Society of the Republic of Srpska, 2020a). The planned activities were aimed to support elderly chronic disease patients and provide home drug delivery in the capital city Banja Luka, as a part of the national campaign 'You are not Alone'. Afterward, the Pharmaceutical Society of RS has widened its professional activities on April 10, providing the free counseling telephone helpline (The Pharmaceutical Society of the Republic of Srpska, 2020b). The campaign had wide media coverage, by national broadcasting service and on the internet. RS citizens were informed about the main goal of the free helpline—to provide access to professional and verified information and to minimise patients' visits to the pharmacy, by giving professional and

relevant information and advice on medications, self-medication, health promotion, dietary supplements and all other relevant health information. The helpline was not intended for advertising purposes, nor for providing information on drug prices.

Since RS belongs to the southeastern European region, sharing policies on health system organisation with the surrounding countries, results derived from the RS community pharmacies may be useful for planning remote pharmaceutical care activities in other middle-income countries. The primary aim of the study was to describe the remote pharmaceutical care service (telepharmacy), firstly introduced in RS during the COVID-19 pandemic. The secondary aim was to identify service users' clinical and psychological needs and concerns during the pandemic and to describe ensuing community pharmacists' interventions, among the general population without constraints in terms of age or chronic diseases.

2 | METHODS

Ten community pharmacists with experience in pharmaceutical care were appointed by the Pharmaceutical Society of RS to deliver remote pharmaceutical care (telepharmacy) activities from 8 a.m. to 8 p.m. Telepharmacy services were provided via telephone, by a centralised call number which was publicly advertised. The calls were redirected to the participating pharmacists (in total 7 community pharmacies) and this service was added in addition to their workload. Telepharmacy included the following services: providing relevant and verified information on coronavirus, patient counseling (including non-pharmacological measures and the recommendations on OTC drugs, dietary supplements), medication review on patient's request (screening for potentially significant drug-drug interactions, contraindications and precautions), health promotion and referral to a physician. Besides telepharmacy service, pharmacists were asked to document issues discussed with the patients/users, after obtaining their verbal permission. The chart for obtaining users' data included 6 items, aimed not to cause a significant additional workload to the pharmacists during the COVID-19 pandemic: (1) call date and time; (2) city/town; (3) user's age; (4) gender; (5) user's question/problem and (6) pharmacist's answer. Users' questions or problems were reported in an open form, providing all the relevant data for the identification of drug-related problems (symptoms description, events timeline, present comorbidities and cotherapy). Answers provided to the patient were also filled by a pharmacist, to present their intervention. The users' data were entered into a *Microsoft Office Word* document by a responsible pharmacist and sent to the Pharmaceutical Society of RS upon the form completion. Data coding and analysis were performed simultaneously by two academic practitioners with PhD in Clinical Pharmacy M.K. and M.Ć.

The prospective data collection included the period from April 13, 2020 (when the first pharmacist started their telepharmacy activities) up to May 21, 2020, when the RS authorities lifted the state of emergency. The research period was linked to the stay at home order and tracking stopped when restrictions lifted and people able

to attend health services in person. Institutional Ethics Committee approved the study (number 846/2).

The data were entered into *Microsoft Office Excel* document. Descriptive and statistical analysis was performed using IBM SPSS Statistics software (ver. 22). To describe the newly introduced remote service, the required sample size was calculated to 69 patients (confidence level 90%; margins of error 10%; population size 20,000+). The results of the descriptive analysis are presented as mean \pm standard deviation (S.D.) for quantitative variables or frequency (number of patients/users n , %) for categorical variables. The difference in proportions between users aged <65 and \geq 65 years was tested using the Chi-square test for independence or Fisher's exact test, where appropriate. The difference in quantitative variables between the two groups was analyzed using Student's t test. A p -value <0.05 was considered statistically significant.

3 | RESULTS

A total of 10 pharmacists from 7 community pharmacies accepted to participate voluntarily in the telepharmacy service. Data were collected for 71 patients/users from April 13, 2020, up to May 21, 2020.

Demographic and clinical characteristics are presented in Table 1. Telepharmacy users were on average 61.31 ± 13.27 years of age, with almost the equal share for adults (aged <65; 35, 49.3%) and elderly persons (\geq 65 years; 36, 50.7%). The difference in gender distribution was statistically significant—women were more prevalent among adults (almost 63%), whereas men were more prevalent in the elderly population (almost 61%) (p -value 0.043, Pearson Chi-square 4.079).

Patients with chronic and/or acute/subacute conditions were predominant with a share of 84.5% (60 patients). Chronic diseases were the main reason for searching pharmacists' consultation (53 patients, 74.6%), out of which 5 patients (7%) had a complaint about worsening of a chronic condition, whereas 7 patients (9.9%) had only acute/subacute conditions (duration up to one month). There were 11 only users (15.5%), asking for information about coronavirus or COVID-19 (and not reporting any other health condition), which was noted as the main reason for calling.

The main reasons for consultation with pharmacists, presented by organ systems, are summarised in Table 2. Cardiovascular disease was the most frequent topic (12, 16.9%), followed by the musculoskeletal system (11, 15.5%) and central nervous system (7, 9.9%), with no significant difference in frequency between adults and elderly patients. Remote pharmaceutical care was provided for patients with a variety of diseases or conditions, involving 10 organ systems and with a total of 32 diseases/conditions listed (Table 2). Information or counseling was provided on 48 different drugs, belonging to 12 anatomical therapeutic chemical (ATC) classification system groups, as presented in Table 3. Telepharmacy users who did not have chronic or acute disease/condition were interested in relevant information on various aspects of COVID-19 pandemic: characteristics of the

TABLE 1 Telepharmacy service users' demographic and clinical characteristics

Number of patients (%)	Total	Age, years		p-value ^a	Pearson Chi-square score
	(N = 71)	<65 (N = 35)	≥65 (N = 36)		
Age, years mean ±S.D. (total range)	61.31 ± 13.27 (25–85)	50.63 ± 9.98	71.69 ± 5.49	<0.001**	
Gender, female	36 (50.7%)	22 (62.9%)	14 (38.9%)	0.043	4.079
Number of comorbidities ^a	1.68 ± 1.20 (0–5)	1.50 ± 1.60	1.82 ± 0.87	0.584**	
Number of drugs ^{††}	2.05 ± 1.88 (0–7)	2.27 ± 2.45	1.80 ± 1.03	0.579**	
Date of call, period after launching telepharmacy service					
Week 1	37 (52.1%)	15 (42.9%)	22 (61.1%)	0.124	2.370
Week 2	13 (18.3%)	6 (17.1%)	7 (19.4%)	0.802	0.063
Week 3	15 (21.1%)	10 (28.6%)	5 (13.9%)	0.130	2.296
Week 4	6 (8.5%)	4 (11.4%)	2 (5.6%)	0.429	0.791
The main reason for contact with a pharmacist					
Chronic condition ^b	53 (74.6%)	27 (77.1%)	26 (72.2%)	0.953	0.672
Acute/subacute condition ^b	12 (16.9%)	6 (17.1%)	6 (16.7%)		
Information about coronavirus or COVID-19	11 (15.5%)	5 (14.3%)	6 (16.7%)	0.782	0.077
Status					
Patients	60 (84.5%)	28 (80%)	32 (88.9%)	0.343	1.071
Service users	11 (15.5%)	7 (20%)	4 (11.1%)		
Counseling topics by organ systems					
Cardiovascular system	12 (16.9%)	5 (14.3%)	7 (19.4%)	0.562	0.336
Musculoskeletal system	11 (15.5%)	5 (14.3%)	6 (16.7%)	0.782	0.077
Central nervous system	7 (9.9%)	5 (14.3%)	2 (5.6%)	0.260	1.522
Gastrointestinal system	6 (8.5%)	0	6 (16.7%)	n.a.	n.a.
Sensory organs (skin, eye, ear and nose)	5 (7%)	3 (8.6%)	2 (5.6%)	0.674	0.247
Immune system	4 (5.6%)	2 (5.7%)	2 (5.6%)	1.000	0.001
Endocrine system	3 (4.2%)	2 (5.7%)	1 (2.8%)	0.614	0.378
Urogenital system	3 (4.2%)	0	3 (8.3%)	n.a.	n.a.
Blood and blood-forming organs	2 (2.8%)	1 (2.9%)	1 (2.8%)	1.000	0.000
Respiratory system	2 (2.8%)	2 (5.7%)	0	n.a.	n.a.

Abbreviation: S.D., standard deviation.

^aThe sample included 19 users' answers; d – the sample included 21 users' answers.

^bThe values do not add up to the number of 60 patients, as there were multiple conditions concomitantly present in 5 patients; n.a. – not applicable

*p-value obtained by Chi-square test for independence or Fisher's exact test, where appropriate; **p-value obtained by Student's *t* tests.

novel coronavirus; therapeutic options for COVID-19 treatment and their availability on the market; protective equipment (how to use masks, shields and gloves); proper use of disinfectants and ways to strengthen the immune system (dietary supplements, vitamins, minerals and non-pharmacological measures) (Table 2).

Table 4 presents pharmacists' interventions resulting from the telepharmacy service. Drug shortages were a common concern

among telepharmacy service users. The pharmacists provided information on drug shortages in 27 consultations (38%), raised as a primary or secondary issue during counseling. A total of 11 different drugs were involved in shortages—the most frequent was clonazepam (8 patients; 11.3%), ranked second were antineoplastics and immunomodulating agents (5, 7%; out of which tamoxifen in 3 patients, 4.2%; capecitabine 1, 1.4%; hydroxycarbamide 1, 1.4%), followed by

TABLE 2 List of patients' main reason for contact with pharmacists, disease-related

Non-COVID-19-related queries	Number of patients (%)
Blood and blood-forming system	2 (2.8%)
Anticoagulation	2 (2.8%)
Cardiovascular system	12 (16.9%)
Angina pectoris	2 (2.8%)
Atrial fibrillation	2 (2.8%)
Bradycardia	1 (1.4%)
Heart failure	1 (1.4%)
Hypertension	4 (5.6%)
Vertigo	2 (2.8%)
Central nervous system	7 (9.9%)
Anxiety	5 (7%)
Insomnia	1 (1.4%)
Psychosis	2 (2.8%)
Post-traumatic stress disorder	1 (1.4%)
Endocrine disease	3 (4.2%)
Diabetes, hypoglycemia	1 (1.4%)
Diabetes, neuropathy	1 (1.4%)
Hypothyroidism	1 (1.4%)
Gastrointestinal system	6 (8.5%)
Constipation	3 (4.2%)
Dysepsia	1 (1.4%)
Hemorrhoids	2 (2.8%)
Musculoskeletal system	11 (15.5%)
Ischialgia	3 (4.2%)
Muscle spasm	1 (1.4%)
Osteoarthritis	2 (2.8%)
Osteoporosis	1 (1.4%)
Rheumatoid arthritis	2 (2.8%)
Systemic lupus erythematosus	5 (7%)
Respiratory system	2 (2.8%)
Asthma	2 (2.8%)
Sensory organs	5 (7%)
Allergic conjunctivitis	1 (1.4%)
Allergic rhinitis	1 (1.4%)
Atopic dermatitis	1 (1.4%)
Glaucoma	3 (4.2%)
Urogenital system	3 (4.2%)
Benign prostatic hyperplasia	1 (1.4%)
Urinary tract infection	1 (1.4%)
Urolithiasis	2 (2.8%)
Other	2 (2.8%)
Postpartum care	1 (1.4%)
Breastfeeding	1 (1.4%)
COVID-19-related queries	11 (15.5%)

(Continues)

TABLE 2 (Continued)

Non-COVID-19-related queries	Number of patients (%)
Chloroquine/hydroxychloroquine	4 (5.6%)
Mechanism of action	4 (5.6%)
Availability on the market	4 (5.6%)
Coronavirus	2 (2.8%)
Consequences	1 (1.4%)
Spreading characteristics	1 (1.4%)
Explanation of social distancing measures	1 (1.4%)
Disinfectants	3 (4.2%)
Types	1 (1.4%)
Mechanism of action	3 (4.2%)
Dilution, method of use	1 (1.4%)
Immune system	3 (4.2%)
Strengthening	3 (4.2%)
Vitamins	2 (2.8%)
Masks	1 (1.4%)
Availability on the market	1 (1.4%)

chloroquine (4, 5.6%) and latanoprost (2, 2.8%), whereas cholecalciferol, hydrocortisone, indapamide, codergocrine mesylate and tizanidine had 1 query each (1.4%). Afterward, the pharmacists informed the patients on available generics on the market in RS (17, 23.9%), or scheduled a follow-up with a patient to provide more detailed information. A therapeutic substitution was proposed and explained to 6 patients (8.5%), which required subsequent prescribing by a physician. A more detailed presentation of the proposed recommendations by patients' characteristics is given in the Appendix.

Pharmacists recommended the pharmacological measures in 18 patients (25.4%), after obtaining detailed patients' history and symptoms description. The dietary supplement was deemed as the best advice for 10 patients (14.1%), followed by topical drug use (5, 7%), OTC for systemic use (3, 4.2%), and herbal drug in 1 patient (1.4%). As the community pharmacists are not allowed to prescribe drugs in the RS, 11 patients (15.5%) were referred to contact their physician for refill/prescribing purposes. Eight patients (11.3%) had been counseled to visit a physician if their state did not improve or if it got worse in a certain period. Patients with cardiovascular disease or central nervous system disease were most frequently referred to a physician (Appendix). Among non-pharmacological interventions, patients required support and counseling on adherence, balanced diet, physical activity, optimal hydration, blood glucose self-measurement as well as other lifestyle measures aimed to minimize vertigo or decrease fall risk. Additionally, 7 patients (9.9%) required psychological support from the pharmacists.

Further, the largest range of interventions was drug-related. Besides the abovementioned drug shortages concerns, a variety of therapy-related aspects were discussed with the patients: safety profile, accurate drug administration (insulin, nitroglycerin, topical antihemorrhoid agents and prednisone), accurate dosing regimen

TABLE 3 List of patients' main reason for contact with pharmacists, drug-related

ATC group	Number of drugs	Drugs
A Alimentary tract and metabolism	4	cholecalciferol, glimepiride, insulin, metformin
B Blood and blood-forming organs	4	aspirin, apixaban, clopidogrel, warfarin
C Cardiovascular system	12	amlodipine, amiodarone, atorvastatin, bisoprolol, enalapril, ergoloid mesylate, furosemide, indapamide, losartan, nitroglycerin, perindopril, trimetazidine
G Genito-urinary system and sex hormones	1	tamsulosin
H Systemic hormonal preparations, excluding sex hormones and insulins	4	hydrocortisone, levothyroxine, methylprednisolone, prednisone
J Antiinfectives for systemic use	2	ciprofloxacin, moxifloxacin
L Antineoplastic and immunomodulating agents	3	capecitabine, hydroxycarbamide, tamoxifen
M Musculoskeletal system	2	diclofenac, tizanidine
N Nervous system	10	alprazolam, bromazepam, carbamazepine, clonazepam, diazepam, escitalopram, paracetamol, risperidone, tramadol, valproate
P Antiparasitic products, insecticides and repellents	2	chloroquine, hydroxychloroquine
R Respiratory system	2	beclomethasone, formoterol
S Sensory organs	2	latanoprost, hypromellose
Total	48	

Abbreviation: ATC, anatomical therapeutic chemical classification system.

(single dose, dosing interval and maximum daily dose), drug administration related to a meal, recommended therapy duration, and explanation of the mechanism of drug action and the time course for achieving a full therapeutic effect. Pharmacists also identified drug duplication, checked for contraindications or precautions, assessed potential clinically significant drug-drug interactions, but also tried to help patients who reported financial constraints with their chronic therapy. Three patients were reassured not to take prescription drugs on their own, as they require thorough assessment and prescribing by a doctor, and for the other three patients, mistakes in drug refill were found (1 prescription was missing per patient among their chronic therapy).

4 | DISCUSSION

To the best of our knowledge, this is the first study conducted in the European community pharmacy setting to assess the telepharmacy service users' needs and pharmacists' interventions during the COVID-19 outbreak. As most of the published results emphasise the need of caring for elderly patients, we have demonstrated that the wide population has its evident needs at this time, which should not be neglected. Particularly, the proportion of health problems did not differ between the adults (<65 years) and the elderly (≥65) in our study sample, except for the gastrointestinal system where constipation, dyspepsia and hemorrhoids were reported only in the elderly patients. Moreover, a large variety of disease-related or drug-related issues were raised by the patients, requiring consultation with a competent health professional. Remote pharmaceutical care

service (telepharmacy) was deemed as a convenient model in the RS, as the vast majority of patients' and users' needs were addressed by a pharmacist during counseling (only 15.5% of the patients required immediate referral to a doctor for refill/prescribing purposes). Moreover, patients showed trust in community pharmacists in maintaining their health during the stressful period, which was also revealed by their initiative for psychological support. COVID-19-related stress and anxiety might have a strong impact on public health. Both otherwise healthy persons, as well as the chronic patients, may experience deterioration of the health status. Therefore, among remote pharmaceutical care activities, psychological support is listed as one of the mandatory tasks (Zheng et al., 2021). In our study, the proportion of telepharmacy service users' who required psychological support was calculated to 9.9%, whereas that percentage was quite higher in other studies, up to 33% (Meghana et al., 2021). Besides applying their medication expertise, community pharmacists are expected to identify patients with excessive anxiety, concern, fear or blind optimism and provide psychological or emotional support (Zheng et al., 2021).

Pharmacist interventions presented in our study are in accordance with international results, proving the accessible position and important role of community pharmacists in providing continuing patient care (Kretchy et al., 2021; Zheng et al., 2021). Cadogan and Hughes outlined the following community pharmacist activities, as a proposal for restructuring of existing health services in the light of the public health response to COVID-19: managing ambulatory conditions; extended prescribing roles and related activities; balancing supply and demand; promoting continued medication adherence and other roles and activities such as medication use reviews,

TABLE 4 Pharmacists' interventions and counseling aspects provided during telepharmacy service

Pharmacists' recommendations	Number of patients (%) ^a
Pharmacological measures	
Dietary supplement	10 (14.1%)
Drug, topical use	5 (7%)
OTC, systemic use	3 (4.2%)
Herbal drug	1 (1.4%)
Non-pharmacological measures	
Adherence	8 (11.3%)
Nutrition	6 (8.5%)
Physical activity	5 (7%)
Hydration	3 (4.2%)
Blood glucose self-measurement	1 (1.4%)
Other measures (posture and decreasing risk of falls)	7 (9.9%)
Referral to a doctor for refill/prescribing purposes	11 (15.5%)
Referral to a doctor in case of a disease/state progression	8 (11.3%)
Psychological support	7 (9.9%)
Drug-related interventions/counseling aspects	
Information on drug shortages	27 (38%)
Information on available generics on the market	17 (23.9%)
Adverse drug effects	10 (14.1%)
Accurate drug administration	7 (9.9%)
Proposing a substitution therapy due to drug shortages	6 (8.5%)
Accurate dosage regimen (dose and dosing interval)	4 (5.6%)
Information on drug prescription regimen	3 (4.2%)
Duration of therapy	3 (4.2%)
Drug prescription refill	3 (4.2%)
Financial constraints	3 (4.2%)
Mechanism of drug action and therapy efficacy	2 (2.8%)
Identification of drug duplication	1 (2.8%)
Checking for contraindications or precautions	1 (1.4%)
Checking for clinically significant drug-drug interactions	1 (1.4%)
Drug administration related to meal	1 (1.4%)
COVID-19-related counseling aspects	
Information on recommended disinfectants	3 (4.2%)
Available pharmacological therapeutic options	2 (2.8%)
Explanation of social distancing measures	2 (2.8%)
Masks availability on the market	1 (1.4%)

Abbreviation: OTC, over the counter.

^aThe values do not add up to 100%, as there were multiple interventions recorded for the patients.

chronic disease management, medication delivery services and video-based consultations to promote social-distancing measures (Cadogan & Hughes, 2021). In our study, among 12 telepharmacy

service users (16.9%) who reported some acute/subacute condition, 9 of them (12.7%) had an ambulatory condition (allergic conjunctivitis, allergic rhinitis, atopic dermatitis, constipation, dyspepsia or hemorrhoids) which could be managed in the community pharmacy setting (Cadogan & Hughes, 2021). It is expected that pharmacists' involvement in this field could potentially reduce general physicians' ambulatory conditions-related workload by more than 50% (Paudyal et al., 2013). Therefore, this set of telepharmacy services should be continued throughout the following pandemic period, with scheduling patients' follow-up and taking regular documentation of the pharmaceutical care process. On the other hand, a large proportion of chronic patients required counseling which could be completely performed via telephone. As presented in Table 4, patients required support on adherence and lifestyle advice. Furthermore, the majority of drug-related issues were resolved by providing relevant information on drug safety and efficacy profile, accurate drug use, dosage, administration with or without meals, drug interactions, contraindications, precautions, therapy duration and avoiding drug duplication. A study by Ibrahim and colleagues also reported a higher proportion of drug-related interventions (range 4.03%-20.36%), provided by community pharmacists during telepharmacy services, which included change in medications due to potential drug-drug interactions or contraindications, removal of duplicate drugs, the addition of another medicine or modifying overdose (Ibrahim et al., 2020).

It is evident that the COVID-19 pandemic has driven the development of innovative and remote pharmacy services around the world (Li et al., 2021) since remote pharmacy services are strongly recommended to reduce human-to-human transmission (Liu et al., 2020; Zheng et al., 2021). Moreover, Poudel and Nissen in 2016 have pointed that telepharmacy was becoming an integral part of modern pharmacy practice, improving the access to quality pharmaceutical services (Poudel & Nissen, 2016). Besides its proven benefit for patients, legal challenges and requirements for the start-up of telepharmacy were marked as considerable pitfalls, such as time, effort and money (Poudel & Nissen, 2016). Interestingly, the COVID-19 pandemic fosters the changes in pharmaceutical care services, surpassing all the anticipated barriers in implementing telepharmacy services. For instance, Spain reported an increase in the number of hospital pharmacy departments that offer telepharmacy programs including the delivery of medications from 17% before the crisis to 80% in the COVID-19 pandemic (Moreno & Gioia, 2020; Tortajada-Goitia et al., 2020).

This study had many limitations. The first is a small sample size, which does not allow us to draw firm conclusions regarding the telepharmacy service contribution to a gap in healthcare during the COVID-19 pandemic. Secondly, data were only collected from the centralised call number and may under-represent the calls fielded by pharmacists from patients that called their pharmacy directly. We did not assess pharmacists' attitudes or perceptions of telepharmacy, which could significantly impact the data collection. Moreover, we used an open-form patient's data chart to collect the data, where a pharmacist was expected to enter the patient's problem/query and the pharmacist's intervention provided to the patient. Therefore,

pharmacist intervention was triggered by a patient's question and on the patient's initiative, whereas no objective structured medication review was performed, unless the patient had a query on that. Consequently, patients' needs might be presented more subjectively from the patients' perspective, and not reflecting the objective clinical needs of a community-based study sample. The results should be more interpreted in terms of descriptive data such as the variety of clinical and psychological needs which patients presented during the emergency. However, level of competence of the pharmacist is not captured in the data presented in the results. The acceptance rate and the outcomes of the pharmacists' interventions, as well as the level of satisfaction with the telepharmacy service, were beyond the scope of the study, and those aspects are crucial for further development and regulation of remote pharmaceutical services. In addition, the impact of the telepharmacy service on pharmacist's time and workload could be an area of future research for exploration.

Telepharmacy service study demonstrated that a heterogeneous group of patients and service users may benefit from remote pharmaceutical care activities. A variety of both ambulatory conditions and chronic diseases were identified in a relatively small sample. Patients and users presented with explicit and specific needs and concerns, both COVID- and non-COVID-related, which should not be neglected. As the most accessible healthcare professionals, community pharmacists showed a high level of resilience and ability in addressing patients' needs, which may have short- and long-term beneficial effects on the health system (Mohamed Ibrahim et al., 2021; Visacri et al., 2021). Apart from pharmacists' impact on controlling the spreading of infection by procurement and providing protective equipment (masks and hand gloves) and disinfectants to the local community, pharmacists are able to deliver telepharmacy services such as patient counseling, chronic disease management, patient monitoring, medication review and patients' referral to a specialist (Muflih et al., 2021). However, it could be concluded that community pharmacists are facing challenges in everyday practice with the demand for expanding activities (The Royal Pharmaceutical Society, 2020). Yet, patients should be encouraged to use remote pharmaceutical care services in the months to come for mutual benefit. Community pharmacists would gain the experience needed to further improve and update pharmaceutical care services for the changing COVID-19 pandemic situation (Arain et al., 2021; Hedima et al., 2021). Furthermore, Muflih et al. highlighted the need for further telepharmacy training to improve clinical competence (Muflih et al., 2021).

ACKNOWLEDGEMENTS

The authors would like to thank pharmacists Ana Srdić, Anica Crkvenčić, Branka Keleč, Dušana Tanasić, Nataša Perućica Jazić, Nataša Milanović, Slavenka Borjanić, Vanja Đurđević, Vanja Ilić and Vanja Jošić for their participation.

CONFLICT OF INTEREST

None declared.

AUTHORS CONTRIBUTION

Milena Kovačević: methodology (lead), investigation (lead), formal analysis (lead), writing—original draft (lead) and writing—review and editing (equal). Milica Čulafić: investigation (equal) and writing—review and editing (equal). Sandra Vezmar Kovačević: writing—review and editing (equal). Slavenka Borjanić: investigation (equal) and writing—review and editing (equal). Branka Keleč: investigation (equal) and writing—review and editing (equal). Branislava Miljković: writing—review and editing (equal). Rada Amidžić: conceptualization (lead), funding acquisition (lead), project administration (lead) and writing—review and editing (equal).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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How to cite this article: Kovačević, M., Čulafić, M., Vezmar Kovačević, S., Borjanić, S., Keleč, B., Miljković, B., & Amidžić, R. (2021). Telepharmacy service experience during the COVID-19 pandemic in the Republic of Srpska, Bosnia and Herzegovina. *Health & Social Care in the Community*, 00, 1–12. <https://doi.org/10.1111/hsc.13590>

APPENDIX

The association between pharmacist's recommendations and patients' characteristics

Pharmacists' recommendations	Patients' clinical characteristics	Proportion of patients		Pearson Chi-square score (X^2)	p-value
		number of patients with a specific clinical characteristic and a specific recommendation/total number of patients with a specific recommendation	number of patients with a specific clinical characteristic and a specific recommendation/total number of patients with a specific clinical characteristic		
Pharmacological measures					
Dietary supplement	Diabetes	2/10	2/2	12.554	0.018
Drug, topical use	Atopic dermatitis	1/5	1/1	13.389	0.019
	Ischialgia	2/5	2/4	11.949	0.023
	Hemorrhoids	1/5	1/1	13.389	0.019
	Nursing mother	1/5	1/1	13.389	0.019
OTC, systemic use	Angina pectoris	1/3	1/1	22.990	0.042
Herbal drug	Constipation	1/1	1/3	22.990	0.042
	Urogenital system	1/1	1/2	34.993	0.028
Non-pharmacological measures					
Adherence	Cardiovascular system	5/8	5/12	13.347	0.003
	Central nervous system	3/8	3/7	7.751	0.027
	Constipation	2/8	2/3	9.615	0.032
	Diabetic neuropathy	2/8	2/3	9.615	0.032
Nutrition	Aged ≥ 65	6/6	6/36	6.372	0.025
	Gastrointestinal system	4/6	4/6	28.710	<0.001
	Constipation	2/6	2/3	13.722	0.017
	Dyspepsia	1/6	1/1	10.988	0.024
	Changes in bowel habits	1/6	1/1	10.988	0.024
Physical activity	Cardiovascular system	2/6	2/12	13.722	0.017
	Gastrointestinal system	2/5	2/6	6.920	0.040
	Constipation	2/5	2/3	17.011	0.012
Hydration	Gastrointestinal system	3/3	3/6	33.934	<0.001
	Constipation	3/3	3/3	71.000	<0.001
	Urogenital system	2/3	2/3	30.179	0.004
	Urolithiasis	2/3	2/2	46.647	0.001
Blood-glucose self-measurement	Diabetes	1/1	1/2	34.993	0.028
	Diabetic neuropathy	1/1	1/3	22.990	0.042
Other measures (posture and decreasing risk of falls)	—				

Pharmacists' recommendations	Patients' clinical characteristics	Proportion of patients		Pearson Chi-square score (X^2)	p-value
		number of patients with a specific clinical characteristic and a specific recommendation/total number of patients with a specific recommendation	number of patients with a specific clinical characteristic and a specific recommendation/total number of patients with a specific clinical characteristic		
Referral to a doctor					
	Cardiovascular system	8/19	8/12	11.733	0.002
	Central nervous system	7/19	7/7	21.253	<0.001
	Diabetic neuropathy	3/19	3/3	8.573	0.017
	Anxiety	4/19	4/5	7.779	0.016
Psychological support					
	Cardiovascular system	4/7	4/12	8.954	0.013
	Central nervous system	3/7	3/7	9.915	0.018
	Anxiety	3/7	3/5	15.216	0.006
	Diabetes	2/7	2/2	18.816	0.008
	Diabetic neuropathy	2/7	2/3	11.374	0.024
Drug-related interventions/counselling aspects					
Information on drug shortages	Aged ≥ 65	8/27	8/36	7.742	0.005
	Chloroquine	5/27	5/5	8.765	0.006
Adverse drug effects	Cardiovascular system	5/10	5/12	9.079	0.003
	Anxiety	3/10	3/5	9.371	0.002
Accurate drug administration	Diabetic neuropathy	2/7	2/3	11.374	0.024
	Allergy	1/7	1/1	9.273	0.029
	Angina pectoris	1/7	1/1	9.273	0.029
	Hemorrhoids	1/7	1/1	9.273	0.029
	Glaucoma	2/6	2/3	13.722	0.017
Proposing a substitution therapy due to drug shortages	—	—	—	—	—
Accurate dosage regimen (dose and dosing interval)	—	—	—	—	—
Information on drug prescription regimen	Vertigo	2/3	2/2	46.647	0.001
Duration of therapy	Allergy	1/3	1/1	22.990	0.042
	Immune system	2/3	2/4	21.947	0.007
	Urinary tract infection	1/3	1/1	22.990	0.042
Drug prescription refill	—	—	—	—	—

Pharmacists' recommendations	Patients' clinical characteristics	Proportion of patients		Pearson Chi-square score (X^2)	p-value
		number of patients with a specific clinical characteristic and a specific recommendation/total number of patients with a specific recommendation	number of patients with a specific clinical characteristic and a specific recommendation/total number of patients with a specific clinical characteristic		
Financial constraints	Anticoagulation therapy	1/3	1/2	10.656	0.046
Mechanism of drug action and therapy efficacy	Cardiovascular system	2/2	2/12	10.118	0.027
	Atrial fibrillation	1/2	1/1	34.993	0.028
Identification of drug duplication	—				
Checking for clinically significant drug-drug interactions	Cardiovascular disease	1/1	1/3	22.657	0.043
Drug administration related to meal	—				
COVID-19-related counseling aspects					
Information on recommended disinfectants	Status: user	3/3	3/11	17.086	0.003
	Psychosis	1/3	1/1	22.990	0.042
Available pharmacological therapeutic options	—				
Explanation of social distancing measures	—				
Masks availability on the market	—				