ORIGINAL RESEARCH

Impact of Pharmacist Interventions at an Outpatient US Coast Guard Clinic

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Background: US Coast Guard (USCG) active-duty service members (ADSMs) are required to maintain medical readiness to maximize operational success. USCG pharmacists serve the traditional pharmacist role while maintaining oversight of regional pharmaceutical services. This study aimed to quantify the number, duty status impact, and replicability of medication interventions made by one pharmacist at the USCG Base Alameda clinic in California over 6 months.

Methods: Medication interventions made at the USCG Base Alameda clinic from July 1, 2021, to December 31, 2021, were categorized as a drug therapy problem (DTP) or non-DTP. Each DTP was further evaluated in a retrospective record review by a panel of USCG pharmacists to assess 2 additional factors: duty status severity (potential to affect duty status) and replicability (potential for the same intervention to be made in the absence of access to the patient health record).

Results: USCG Base Alameda pharmacy dispensed 1751 prescriptions and made 116 interventions (7%), of which 111 (96%) were accepted by the prescriber. Of the interventions, 64 (55%) were DTPs, and 14 of those (22%) had potential to change duty status, and 18 DTPs (28%) were made because the pharmacist had access to the health record.

Conclusions: Pharmacists' role in USCG clinics includes collaborating with the patient care team to make medication interventions that have significant impact on ADSMs' wellness and the USCG mission.

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The US Coast Guard (USCG) operates within the US Department of Homeland Security during times of peace and represents a force of > 55,000 active-duty service members (ADSMs), civilians, and reservists. ADSMs account for about 40,000 USCG personnel. The missions of the USCG include activities such as maritime law enforcement (drug interdiction), search and rescue, and defense readiness.[1] Akin to other US Department of Defense (DoD) services, USCG ADSMs are required to maintain medical readiness to maximize operational success.

Whereas the DoD centralizes its health care services at military treatment facilities, USCG health care tends to be dispersed to smaller clinics and sickbays across large geographic areas. The USCG operates 42 clinics of varying sizes and medical capabilities, providing outpatient, dentistry, pharmacy, laboratory, radiology, physical therapy, optometry, and other health care services. Many ADSMs are evaluated by a USCG medical officer in these outpatient clinics, and ADSMs may choose to fill prescriptions at the in-house pharmacy if present at that clinic.

The USCG has 14 field pharmacists. In addition to the standard dispensing role at their respective clinics, USCG pharmacists provide regional oversight of pharmaceutical services for USCG units within their area of responsibility (AOR). Therefore, USCG pharmacists clinically, operationally, and logistically support these regional assets within their AOR while serving the traditional pharmacist role. USCG pharmacists have access to ADSM electronic health records (EHRs) when evaluating prescription orders, similar to other ambulatory care settings.

New recruits and accessions into the USCG are first screened for disqualifying health conditions, and ADSMs are required to maintain medical readiness throughout their careers.[2] Therefore, this population tends to be younger and overall healthier compared with the general population. Equally important, medication errors or inappropriate prescribing in the ADSM group could negatively affect their duty status and mission readiness of the USCG in addition to exposing the ADSM to medication-related harms.

Duty status is an important and unique consideration in this population. ADSMs are expected to be deployable worldwide and physically and mentally capable of executing all duties associated with their position. Duty status implications and the perceived ability to stand watch are tied to an ADMS's specialty, training, and unit role. Duty status is based on various frameworks like the USCG Medical Manual, Aeromedical Policy Letters, and other governing documents.[3] Duty status determinations are initiated by privileged USCG medical practitioners and may be executed in consultation with relevant commands and other subject matter experts. An inappropriately dosed antibiotic prescription, for example, can extend the duration

that an ADSM would be considered unfit for full duty due to prolonged illness. Accordingly, being on a limited duty status may negatively affect USCG total mission readiness as a whole. USCG pharmacists play a vital role in optimizing ADSMs' medication therapies to ensure safety and efficacy.

Currently no published literature explores the number of medication interventions or the impact of those interventions made by USCG pharmacists. This study aimed to quantify the number, duty status impact, and replicability of medication interventions made by one pharmacist at the USCG Base Alameda clinic over 6 months.

METHODS

As part of a USCG quality improvement study, a pharmacist tracked all medication interventions on a spreadsheet at USCG Base Alameda clinic from July 1, 2021, to December 31, 2021. The study defined a medication intervention as a communication with the prescriber with the intention to change the medication, strength, dose, dosage form, quantity, or instructions. Each intervention was subcategorized as either a drug therapy problem (DTP) or a non-DTP intervention. Interventions were divided into 7 categories.

Each DTP intervention was evaluated in a retrospective chart review by a panel of USCG pharmacists to assess for duty status severity and replicability. For duty status severity, the panel reviewed the intervention after considering patient-specific factors and determined whether the original prescribing (had there not been an intervention) could have reasonably resulted in a change of duty status for the ADSM from a fit for full duty (FFFD) status to a different duty status (eg, fit for limited duty [FFLD]). This duty status review factored in potential impacts across multiple positions and billets, including aviators (pilots) and divers. In addition, the panel, whose members all have prior community pharmacy experience, assessed replicability by determining whether the same intervention could have reasonably been made in the absence of access to the patient EHR, as would be common in a community pharmacy setting.

Interventions without an identified DTP were considered non-DTP interventions. These interventions involved recommendations for a more cost-effective medication or a similar in stock therapeutic option to minimize delay of patient care. The spreadsheet also included the date, medication name, medication class, specific intervention made, outcome, and other descriptive comments.

TABLE 1 Pharmacy Medication Interventions (N = 64)

Categories	Interventions	No. (%)
Indication	Requires additional drug therapy	15 (23)
	Unnecessary drug therapy	6 (9)
Effectiveness	Requires different drug product	8 (13)
	Dosage too low	12 (19)
Safety	Adverse drug reaction	2 (3)
	Dosage too high	17 (27)
Adherence	Nonadherence	4 (6)

RESULTS

During the 6-month period, 1751 prescriptions were dispensed at USCG Base Alameda pharmacy with 116 interventions (7%). Most interventions (n = 111, 96%) were accepted by the prescriber. Of the 116 interventions, 64 (55%) were DTP interventions; 21 of the DTP interventions (33%) were indication, 20 effectiveness (31%), 19 safety (30%), and 4 adherence (6%) (Table 1).

Among the DTP interventions, 26 (41%) dealt with an inappropriate dose, 13 (20%) were for medication omission, 7 (11%) for inappropriate dosage form, and 6 (9%) for excess medication (Table 2). Fourteen interventions (22%) impacted duty status, and 18 (28%) were made because the pharmacist had EHR access. Among 51 non-DTP interventions, 34 (67%) minimized delay in patient care, and 17 (33%) cost-savings interventions were made, resulting in about $1700 in savings. Antibiotics had the most interventions (n = 28: 10 DTP and 18 non-DTP).

DISCUSSION

This study is novel in examining the impact of a pharmacist's medication interventions in a USCG ambulatory care practice setting. A PubMed literature search of the phrases "Coast Guard AND pharmacy" or "Coast Guard AND pharmacy AND intervention" yielded no results specific to pharmacy interventions in a USCG setting. However, the 2021 implementation of the enterprise-wide MHS GENESIS EHR may support additional tracking and analysis tools in the future.

TABLE 2 The Impacts of Interventions

Type	Outcomes prevented	No.
DTP	Incorrect dosage	26
	Omission of drug therapy	13
	Incorrect medication form	7
	Excess medication	6
	Duplicate medication	3
	Wrong patient	3
	Inappropriate directions	2
Non-DTP	Delay in patient care	34
	Cost savings	17

Abbreviation: DTP, drug therapy problem.

Pharmacist interventions have been studied in diverse patient populations and practice settings, and most conclude that pharmacists make meaningful interventions at their respective organizations.[4-7] Many of these studies were conducted at open-door health care systems, whereas USCG clinics serve ADSMs nearly exclusively. The ADSM population tends to be younger and healthier due to age requirements and medical accession and retention standards.

It is important to recognize the value of a USCG pharmacist in identifying and rectifying potential medication errors, particularly those that may affect the ability to stand duty for ADSMs. An example intervention includes changing the daily starting dose of citalopram from the ordered 30 mg to the intended 10 mg. Inappropriately prescribed medication regimens may increase the incidence of adverse effects or prolong duration to therapeutic efficacy, which impairs the ability to stand duty. There were 3 circumstances where the prescriber had ordered the medication for an incorrect ADSM that were rectified by the pharmacist. If left unchanged, these errors could negatively affect the ADSM's overall health, well-being, and duty status.

The acceptance rate for interventions in this study was 96%. The literature suggests a highly variable acceptance rate of pharmacist interventions when examined across various practice settings, health systems, and geographic locations.[8-10] This study's comparatively high rate could be due to the pharmacist-prescriber relationships at USCG clinics. By virtue of colocatation and teamwork initiatives, the pharmacist has the opportunity to develop positive rapport with physicians, physician assistants, and other clinic staff.

Having access to EHRs allowed the pharmacist to make 18 of the DTP interventions. Chart access is not unique to the USCG and is common in other ambulatory care settings. Those 18 interventions, such as reconciling a prescription ordered as fluticasone/salmeterol but recorded in the EHR as "will prescribe montelukast," were deemed possible because of EHR access. Such interventions could potentially be lost if ADSMs solely received their pharmaceutical care elsewhere.

USCG uses independent duty health services technicians (IDHSs) who practice in settings where a medical officer is not present, such as at smaller sickbays or aboard Coast Guard cutters. In this study, an IDHS had mistakenly created a medication order for the medical officer to sign for bupropion SR, when the ADSM had been taking and was intended to continue taking bupropion XL. This order was signed off by the medical officer, but this oversight was identified and corrected by the pharmacist before dispensing. This indicates that there is a vital educational role that the USCG pharmacist fulfills when working with health care team members within the AOR.

Equally important to consider are the non-DTP interventions. In a military setting, minimizations of delay in care are a high priority. There were 34 instances where the pharmacist made an intervention to recommend a similar therapeutic medication that was in stock to ensure that the ADSM had timely access to the medication without the need for prior authorization. In the context of short-notice, mission-critical deployments that may last for multiple months, recognizing medication shortages or other inventory constraints and recommending therapeutic alternatives ensures that the USCG can maintain a ready posture for missions in addition to providing timely and quality patient care.

Saving about $1700 over 6 months is also important. While this was not explicitly evaluated in the study, prescribers may not be acutely aware of medication pricing. There are often significant price differences between different formulations of the same medication (eg, naproxen delayed-release vs tablets). Because USCG pharmacists are responsible for ordering medications and managing their regional budget within the AOR, they are best poised to make cost-savings

recommendations. These interventions suggest that USCG pharmacists must continue to remain actively involved in the patient care team alongside physicians, physician assistants, nurses, and corpsmen. Throughout this setting and in so many others, patients' health outcomes improve when pharmacists are more engaged in the pharmacotherapy care plan.

Limitations

Currently, the USCG does not publish ADSM demographic or health-related data, making it difficult to evaluate these interventions in the context of age, gender, or type of disease. Accordingly, potential directions for future research include how USCG pharmacists' interventions are stratified by duty station and initial diagnosis. Such studies may support future models where USCG pharmacists are providing targeted education to prescribers based on disease or medication classes.

This analysis may have limited applicability to other practice settings even within USCG. Most USCG clinics have a limited number of medical officers; indeed, many have only one, and clinics with pharmacies typically have 1 to 5 medical officers aboard. USCG medical officers have a multitude of other duties, which may impact prescribing patterns and pharmacist interventions. Statistical analyses were limited by the dearth of baseline data or comparative literature. Finally, the assessment of DTP interventions' impact did not use an official measurement tool like the US Department of Veterans Affairs' Safety Assessment Code matrix.[11] Instead, the study used the internal USCG pharmacist panel for the fitness for duty consideration as the main stratification of the DTP interventions' duty status severity, because maintaining medical readiness is the top priority for a USCG clinic.

CONCLUSIONS

The multifaceted role of pharmacists in USCG clinics includes collaborating with the patient care team to make pharmacy interventions that have significant impacts on ADSMs' wellness and the USCG mission. The ADSMs of this nation deserve quality medical care that translates into mission readiness, and the USCG pharmacy force stands ready to support that goal.

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Ethics and consent

Institutional review board approval was not required for this quality improvement study.

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