

Clinical Laboratory with the Cooperation of Pharmacist and Nurses in Delivering Propar Antimicrobial Drugs

Rehab Matar Alharbi¹, Sara Fawzi Adas², Manal Saeed Bugshan³, Abdulailah Joud Allah Almutairi⁴, Ahmed Abdulhamid Alahmed⁵, Yousef Mohammad Almohmadsaleh⁶, Abdullah Fahad Alsalem⁷, Hamad Mohammed Al-Hamad⁸, Tahani Ibrahim Alsubaie⁹, Saud Mohammed Alsalamah¹⁰, Fatima Ali Saad Al-Ahmari¹¹, Lamyaa Hassan Mohammed Hakami¹², Huda Jaber Abdulrahman Alzahrani¹³, Yahia Jaber Essa Alhagawy¹⁴, Salamah Saeed Alshahrani¹⁵

¹Laboratory specialist, King Fahd general hospital jeddah

²Medical laboratory technician, King fahad general hospital

³Laboratory technician, King Fahd general hospital jeddah

⁴Laboratory technician, regional laboratory in medina

⁵Laboratory technician, king fahad hospital hofuf

⁶Labrorery, king fahad hospital hofuf

⁷Laboratory comprehensive screening center in dammam

⁸Pharmacist, al-jabr eye and ent hospital

⁹Pharmacist, al muraba health care center

¹⁰Pharmacist, duruma hospital

¹¹Nursing specialist, Ibn Sina Hospital, Mecca

¹²Specialist Nursing, King Abdullah Medical Hospital (KAMCJ) Jeddah (JEDDAH SECOND HEALTH CLUSTER)

¹³The first health cluster in Jeddah, Al-Quzain Health Center in Jeddah, Nursing technician

¹⁴Senior nursing specialist, hospital name: alreith general hospital

¹⁵Nursing specialist, hospital name: alreith general hospital

Abstract

One of the most significant factors that is regarded to be contributing to the rise of antimicrobial resistance is the usage of antimicrobials without proper consideration. Pharmacists, nurses, and clinical microbiologists are in a strategic position to encourage the sensible use of antimicrobial medications. Community pharmacies are the primary source of access to antimicrobials. Because of this, it is essential to be aware of the quality of the dispensing service. According to the findings of the evaluation, the quality of antimicrobial dispensing is unsatisfactory, which calls for enhancements in practice as well as diversified ways to encourage the professionals involved in the process to continue their education. In addition, it is necessary to perform awareness initiatives for the general community in order to encourage the responsible utilization of antimicrobials and to decrease the level of microbial resistance.

Keywords: *antimicrobials, Pharmacists, nurses.*

Introduction

The discovery of antimicrobials is widely regarded as one of the most important developments in the field of contemporary medicine during the course of the last century. Their indiscriminate use, on the other hand, has become a rising public health concern due to the fact that antimicrobials have been extensively involved in the development of microbial resistance [1]. If this issue is not addressed, it is projected that microbial resistance is responsible for 700,000 fatalities worldwide each year. If this problem is not addressed, the number of deaths could rise to as high as 10 million by the year 2050... Based on estimates, microbial resistance has been responsible for around two million illnesses and 23,000 fatalities in the United States, with an annual economic effect ranging from fifty-five to seventy billion dollars [3].

When viewed in this light, the challenge of managing microbial resistance is one that health systems all over the world must tackle. It has been estimated by the World Health Organization that community pharmacies are responsible for approximately 93% of the availability of antimicrobial antibiotics [3]. According to this point of view, pharmacists can be regarded as the final barrier throughout the process of distribution, as they are able to prevent the inappropriate use of antimicrobials and the potential health concerns that could emerge from such use. A large number of patients who are looking for treatment-related counseling and medicine are served by the dispensing, which is very accessible, has widespread visibility in community pharmacies, and is widely available [4].

A drug dispensing service is a service that ensures the provision of medications and other health products by analyzing the technical and legal aspects of a prescription, determining the individual's health needs, and providing medical intervention through pharmaceutical counseling and documentation when necessary. A dispensing procedure that is well-structured has the potential to become a valued service because it has the ability to restrict the use of

antimicrobials without discrimination, and consequently, microbial resistance [5].

Different clinical laboratories play different roles in the process of making a rapid diagnosis on clinical samples, and the methods that can be used to speed up the diagnosis process are also different. In the context of antimicrobial stewardship, the following are just a few instances of how diagnostic procedures might be increased in speed. In less than an hour, it is now possible to confirm or rule out a diagnosis of respiratory syncytial virus (RSV) or influenza virus. This comes as a result of recent advancements in diagnostic technology. Through the addition of a laboratory message, these findings have the potential to affect antimicrobial stewardship. In the event that the findings for influenza virus and RSV are both negative, the results that are provided may be followed by the message that reads, "Consider suspending oseltamivir or other antiinfluenza drug if started." The message "Consider suspending antibiotic therapy if began in this patient" could be prompted automatically in the event that the flu test results are positive. In addition, if the laboratory finds that a patient has RSV but the result of the flu test is negative, the message that they provide to the patient may be something along the lines of, "Consider postponing both anti-influenza medication such as oseltamivir and anti-bacterial treatment." In recent years, there has been a substantial advancement in the form of a new flu test that is based on the detection of nucleic acid and is offered at a reasonable price in the laboratory [6,7].

Review:

It has been demonstrated through research that interactions between patients and pharmacists make it possible for community pharmacies to implement interventions that maximize the utilization of antimicrobial medicine. In spite of this, there is a paucity of empirical evidence concerning the spectrum of antimicrobial dispensing practices and treatments that are offered by pharmacists. Previous research has concentrated on the frequency and proportion

of antimicrobials that are sold without prescription in community pharmacies, as well as the primary diseases and antimicrobials that are implicated in these activities, and the opinions of pharmacists regarding the selling of antimicrobials without prescription [8].

The majority of studies have concentrated on dispensing antimicrobials without prescriptions, despite the fact that there is a substantial body of literature on antimicrobial dispensing. The countries in Asia and Africa that have low and moderate incomes are most affected by this phenomenon. These findings are supported by the findings of a comprehensive study conducted by Batista et al. [9], which found that Asia had the largest percentage of situations in which antimicrobials were distributed without a prescription. The lack of availability and accessibility of health facilities, the economic benefits to the pharmacy team, the limited knowledge of antimicrobials among the population and the pharmacy team, the absence of information about the negative impact of this practice, and the ineffective enforcement of regulations are some of the primary factors that contribute to this practice [10]. Therefore, in order to limit the inappropriate use of antimicrobials, it is necessary to develop multiple ways to address these challenges. These efforts should, among other things, include increasing population awareness and professional qualifications.

A significant number of the studies that were incorporated into this evaluation utilized the simulated patient method in order to evaluate the procedure of antibiotic dispensing. The simulated patient approach involves a trained individual who visits the pharmacy in a manner that is indistinguishable from that of a real patient. This individual goes through a series of planned scenarios in order to evaluate the information gathering and counseling services that pharmacists provide in the process of providing medicines. Observing actual practice behavior in a manner that is not intrusive is made possible through the use of simulated patient approaches, which are regarded as the "gold standard" for determining the quality of behavior [11]. Furthermore, in comparison to other methods for evaluating the quality of

service, this method offers a number of significant advantages since it reduces the impact of the Hawthorne effect. It is therefore recommended that studies make use of the simulated patient method in order to evaluate the care that pharmacists offer and to encourage a change in practice [12].

During the course of the current research, pharmacists and pharmacy teams asked more questions than they offered counseling regarding the utilization of medications. Additional research has demonstrated that the percentage of counseling that is delivered by pharmacists and the pharmacy team is likewise quite low. According to the research that has been conducted, pharmaceutical counseling is an indispensable part of the dispensing process. Not only does the counseling that pharmacists offer during the dispensing process help to prevent the improper use of antimicrobials, but it also helps to promote treatment adherence and raises the patient's understanding of the significance of the treatment regimen [13]. It is for this reason that pharmaceutical counseling must always be present in the process of drug dispensing [13], despite the fact that some conditions can have an effect on the quantity and quality of pharmaceutical counseling.

One of the interventions that was carried out to encourage patients to visit primary healthcare units was the referral of patients to medical professionals, which was included in the studies. In a similar vein, a study that was carried out previously also mentioned that in certain instances, referrals were suggested as an alternative to the practice of giving antimicrobials without a prescription. According to the findings of other studies, there is a low level of attention and intervention in the health requirements of patients [14]. Additionally, another study included educational interventions with the purpose of reducing the indiscriminate selling of antimicrobials. The interventions resulted in a reduction in the number of referrals, but they did not affect the amount of antimicrobials that were distributed to children. As a result of the indiscriminate use of antimicrobials for health disorders that do not require such treatment, this evidence raises concerns regarding the

attitude that is taken by pharmacists and pharmacy teams. This is because medical referrals have the ability to minimize the development of microbial resistance. In light of this, there is an immediate requirement to promote a proactive mindset among pharmacists and to integrate educational interventions carried out by the pharmacy team with the goal of increasing knowledge among the general community regarding the appropriate utilization of antimicrobials [15].

This scoping review revealed that no study has evaluated the quality of the antimicrobial dispensing process up until this point, highlighting a need that has not yet been satisfied. Previous studies have utilized methods to evaluate dispensing processes, such as the utilization of instruments that are available in the literature and performance assessment sheets that were constructed by the authors based on guidelines and observation protocols [16]. Despite the fact that identifying and measuring quality services is a difficult task, quality assessment is absolutely necessary in order to identify problems, deficiencies in the provision of care, and points of improvement. Additionally, quality assessment is necessary in order to outline strategies to overcome these deficiencies and monitor the effectiveness of corrective measures [17]. As a result, it is recommended that future research engage in the creation of quality indicators for antimicrobial dispensing, as well as the development and validation of devices that can evaluate the quality of dispensing. As an additional recommendation, we suggest that more research be carried out in order to offer proof regarding the quality of the antimicrobial dispensing strategy.

Our research has shown that in countries with low and intermediate incomes, pharmacists and pharmacy teams that have received adequate training have the potential to play a role in overcoming the worldwide challenge of microbial resistance. Furthermore, we have emphasized that training has the potential to enhance the role that pharmacy professionals play [68]. It is imperative that pharmacists continue their education while working in community pharmacies [17], since these

concerns highlight the importance of this requirement.

When the management and control of infectious diseases are taken into consideration, the new trend in health care also has some effects that are not something that intended. Hospital-based laboratories have lost a considerable amount of financial resources as a result of the transition from fee-for-service payments to a capitated, or managed care contract, reimbursement structure. Restructuring, centralizing, or consolidating laboratory services, including clinical microbiology laboratories, into bigger working groups that serve many hospitals and retain fewer staff members with specialist microbiological expertise has been an additional approach that has been taken to limit costs. Not just on a national level, but also on a regional level, such restructuring has taken place. One of the primary goals of this consolidation of laboratories is to achieve the highest possible level of testing efficiency while simultaneously reducing expenses. On occasion, an additional benefit that is advocated for is the development of facilities that offer a greater variety of services [18].

The idea that what appears to be economically optimal would also fulfill the changing needs for the treatment and control of infectious diseases is being challenged by a number of disturbing phenomena at the same time that laboratory consolidation is taking place. When it comes to children's hospitals, having virology laboratories on-site is very beneficial to the outcome. In the event that the low-volume testing areas of virology and mycobacteriology were not included in the survey, just six out of the 272 other clinical microbiology testing areas were successfully centralized. According to these findings, it is challenging to maintain quality for the majority of infectious disease tests when using a management strategy that places microbiological analysis at a distance from patient care [19].

There have been two recent investigations that have examined the capability of microbiology laboratories to perform satisfactorily in proficiency surveys. Both of these reports have

found that there is very little concern regarding the maintenance of test quality. In one of these studies, the investigators examined test performance prior to, during, and after the restructuring that took place in the Canadian health care system between the years 1993 and 1998. This was done as a measure of quality in the system. This is a really concerning discovery that they made [19].

Numerous laboratories underwent reorganization, which resulted in the elimination of medical technologists, pathologists, and/or medical microbiologists who were specifically devoted to the process of conducting microbiology tests. However, they continued to make the decision to carry out all levels of laboratory testing in order to diagnose infectious diseases. They continued to show improvements in performance on the proficiency test samples; by the end of the observation period, they made errors in bacterial identification and susceptibility testing 15% of the time. The laboratories that were not restructured and that maintained testing done by experienced and dedicated personnel continued to show improvements in performance. The laboratories that were reorganized and staffed with generalists, in addition to increasing the variety of services they provided, continued to make a significant number of errors in identification and susceptibility tests with regard to the substances they tested for. This finding is most likely due to the fact that they employed workers with less experience, which resulted in a decrease in their level of technical expertise. This is in contrast to the laboratories that kept staff members who had specialized expertise. The reorganized laboratories increased the amount of mistakes that were made in the identification of bacteria by a factor of two as a result of this. In total, the technical personnel in these laboratories made mistakes in identification or susceptibility tests on thirteen hundred percent of the samples that they were given for the proficiency exam [20].

Conclusion:

The majority of research on antimicrobial dispensing procedures has been conducted in countries with low and intermediate incomes, with a particular emphasis on the practise of dispensing antimicrobials without the need for a prescription. During the dispensing process, there were very few questions asked of patients, and the degree of patient counseling that was provided was lower than what was expected of pharmacists and the pharmacy team. This indicates that there is a deficiency in the practice. Consequently, it is vital to enhance the procedures of antimicrobial dispensing in order to encourage the application of these drugs in a reasonable manner.

Continuous audits of antibiotic treatments were carried out by pharmacists, nurses, and clinical microbiologists. These individuals also provided regular input to multidisciplinary teams and handled cases of nonadherence as soon as they were discovered. Every day and every week, it was seen that pharmacists were monitoring, documenting, and collecting treatment information for the purpose of determining whether or not antibiotic management protocols were being followed.

Reference

- [1] Schellack N, Pretorius R, Messina AP. 'Esprit de corps': Towards collaborative integration of pharmacists and nurses into antimicrobial stewardship programmes in South Africa. *S Afr Med J*. 2016 Sep 23;106(10):973-974.
- [2] Chang J, Ye D, Lv B, Jiang M, Zhu S, Yan K, Tian Y, Fang Y. Sale of antibiotics without a prescription at community pharmacies in urban China: a multicentre cross-sectional survey. *J Antimicrob Chemother*. 2017;72(4):1235–1242.
- [3] Walia K, Ohri VC, Mathai D. Antimicrobial stewardship Programme of I: antimicrobial stewardship programme (AMSP) practices in India. *Indian J Med Res*. 2015;142(2):130–138. doi: 10.4103/0971-5916.164228.

- [4] Padget M, Guillemot D, Delarocque-Astagneau E. Measuring antibiotic consumption in low-income countries: a systematic review and integrative approach. *Int J Antimicrob Agents*. 2016;48(1):27–32. doi: 10.1016/j.ijantimicag.2016.04.024.
- [5] Miller R, Goodman C. Performance of retail pharmacies in low- and middle-income Asian settings: a systematic review. *Health Policy Plan*. 2016;31(7):940–953. doi: 10.1093/heapol/czw007.
- [6] Fang Y, Yang S, Feng B, Ni Y, Zhang K. Pharmacists' perception of pharmaceutical care in community pharmacy: a questionnaire survey in Northwest China. *Health Soc Care Community*. 2011;19(2):189–197.
- [7] Hashmi FK, Hassali MA, Khalid A, Saleem F, Aljadhey H, Babar ZUD, Bashaar M. A qualitative study exploring perceptions and attitudes of community pharmacists about extended pharmacy services in Lahore, Pakistan. *BMC Health Serv Res*. 2017;17(1):500. doi: 10.1186/s12913-017-2442-6.
- [8] Sancar M, Okuyan B, Apikoglu-Rabus S, Izzettin FV. Opinion and knowledge towards pharmaceutical care of the pharmacists participated in clinical pharmacy and pharmaceutical care continuing education program. *Turkish J Pharmaceutical Sci*. 2013;10(2):245–254.
- [9] Kho BP, Hassali MA, Lim CJ, Saleem F. A qualitative study exploring professional pharmacy services offered by community pharmacies in the state of Sarawak, Malaysia. *J Pharm Health Serv Res*. 2017;8(3):201–208. doi: 10.1111/jphs.12181.
- [10] Bilal AI, Tilahun Z, Gebretekla GB, Ayalneh B, Hailemeskel B, Engidawork E. Current status, challenges and the way forward for clinical pharmacy service in Ethiopian public hospitals. *BMC Health Serv Res*. 2017;17(1):359. doi: 10.1186/s12913-017-2305-1.
- [11] Salim AM, Elhada AH, Elgizoli B. Exploring clinical pharmacists' perception of their impact on healthcare in Khartoum state, Sudan. *J Res Pharm Pract*. 2016;5(4):272–278. doi: 10.4103/2279-042X.192459.
- [12] Farina SS, Romano-Lieber NS. Pharmaceutical care in pharmacies: is there a changing process? *Saúde e Sociedade*. 2009;18:7–18. doi: 10.1590/S0104-12902009000100002.
- [13] AbuRuz S, Al-Ghazawi M, Snyder A. Pharmaceutical care in a community-based practice setting in Jordan: where are we now with our attitudes and perceived barriers? *Int J Pharm Pract*. 2012;20(2):71–79. doi: 10.1111/j.2042-7174.2011.00164.x.
- [14] Katoue MG, Awad AI, Schwinghammer TL, Kombian SB. Pharmaceutical care in Kuwait: hospital pharmacists' perspectives. *Int J Clin Pharm*. 2014;36(6):1170–1178. doi: 10.1007/s11096-014-0013-z.
- [15] El Hajj MS, Al-Saeed HS, Khaja M. Qatar pharmacists' understanding, attitudes, practice and perceived barriers related to providing pharmaceutical care. *Int J Clin Pharm*. 2016;38(2):330–343. doi: 10.1007/s11096-016-0246-0.
- [16] Brink AJ, Messina AP, Feldman C, Richards GA, Becker PJ, Goff DA, Bauer KA, Nathwani D, van den Bergh D. Antimicrobial stewardship across 47 south African hospitals: an implementation study. *Lancet Infect Dis*. 2016;16(9):1017–1025. doi: 10.1016/S1473-3099(16)30012-3.
- [17] Zhou Y, Ma LY, Zhao X, Tian SH, Sun LY, Cui YM. Impact of pharmacist intervention on antibiotic use and prophylactic antibiotic use in urology clean operations. *J Clin Pharm Ther*. 2015;40(4):404–408. doi: 10.1111/jcpt.12275.
- [18] Shen J, Sun Q, Zhou X, Wei Y, Qi Y, Zhu J, Yan T. Pharmacist interventions on antibiotic use in inpatients with respiratory tract infections in a Chinese hospital. *Int J Clin Pharm*. 2011;33(6):929–933. doi: 10.1007/s11096-011-9577-z.
- [19] Yen YH, Chen HY, Wuan-Jin L, Lin YM, Shen WC, Cheng KJ. Clinical and economic impact of a pharmacist-managed

- i.V.-to-p.O. conversion service for levofloxacin in Taiwan. *Int J Clin Pharmacol Ther.* 2012;50(2):136–141. doi: 10.5414/CP201579.
- [20] Dunn K, O'Reilly A, Silke B, Rogers T, Bergin C. Implementing a pharmacist-led sequential antimicrobial therapy strategy: a controlled before-and-after study. *Int J Clin Pharm.* 2011;33(2):208–214. doi: 10.1007/s11096-010-9475-9.