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Enhancing Collaboration Between Pharmacy and Laboratories for Quality Control During Peak Periods: Impact on Reducing Medication Errors and Optimizing Antibiotic Use

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Abstract

Introduction

Effective collaboration between pharmacy and laboratory departments is crucial for enhancing healthcare quality, particularly during peak periods. Such interdisciplinary integration has been shown to improve patient safety, reduce medication errors, and optimize antibiotic use.

Methods

A systematic review was conducted, focusing on peer-reviewed articles that examine the role of interdisciplinary integration among clinical pharmacy, nursing, and medical laboratories in enhancing healthcare quality. The review aimed to identify barriers and facilitators influencing the effectiveness of such collaborations.

Results

The analysis revealed that interdisciplinary integration significantly improves patient safety, reduces medication errors, and enhances diagnostic accuracy. Clear communication protocols, mutual respect among professionals, and the use of advanced digital systems for data sharing foster effective collaboration. Conversely, barriers such as insufficient training, hierarchical dynamics, and resource limitations were noted.

Discussion

The findings underscore the importance of addressing challenges like role ambiguity, communication gaps, and resource constraints to enhance the success of interdisciplinary collaborations. Implementing clear communication protocols, fostering mutual respect among professionals, and utilizing integrated data systems are key strategies to achieve these outcomes.

Conclusion

Enhancing collaboration between pharmacy and laboratory departments during peak periods can lead to significant improvements in patient safety, reduction in medication errors, and optimization of antibiotic use. Overcoming integration challenges requires targeted training programs, robust communication frameworks, and organizational support to foster teamwork.

Keywords:

Interdisciplinary collaboration, clinical pharmacy, medical laboratories, healthcare quality, medication errors, antibiotic use, patient safety.

1. Introduction

Laboratories and pharmacies occupy central roles in the hospital environment, although they do not always cooperate in quality control, particularly during peak activity. This is surprising concerning controlling dosages and dosing intervals of antibiotics because laboratories contribute to optimizing antibiotic use and because excessive dosages and too short dosing intervals can give rise to medication errors and disease development. Hospitals often see patient numbers rise suddenly, for example, after a catastrophe, in winter diseases, or after mass gatherings such as music festivals. This can lead to laboratory and pharmacy staff reaching their limits. To prevent medication errors, patients generally require systematic monitoring, particularly when peak numbers of patients are expected at different times of the day. The sudden arrival of new patients is additionally prone to lead to an increase in the number of requested laboratory tests, including cultures to support physician decision-making. Collaboration between laboratory and pharmacy can facilitate this during peak times. Medication errors occur due to requirements in the laboratory or pharmacy. Fortunately, the numbers of errors and risk relative to the benefit of antibiotic treatment may be regarded as being tolerably low, but nowadays are threatened by increasing antibiotic resistance. For this reason, widespread use and potential abuse of antibiotic drugs is not justified. Therefore, healthcare organizations should optimize and monitor antibiotic use. In this respect, laboratories play an important role in advising and educating.

1.1. Background and Rationale

Routine practices in healthcare have considerably evolved regarding hospital pharmacies and clinical laboratories, initially with the support of experienced and dedicated pharmacists who, with increasing skills, have been taking over the management of these departments, providing them with better technical and managerial tools. Effective pharmacists have increasingly delegated to technicians and specialists part of the specific tasks related to the purchase, reception, storage, distribution, and even production of drugs and pharmaceuticals, devices, and diagnostics. In clinical laboratories occurring at the same time, an increasing process of industrial automation, as well as the continuous incorporation into single instruments of more and more functional characteristics, has

made it necessary to define the work organization forms that in recent years have been tackled for some types of analysis in an exclusively automated way, where the technician's role is primarily found in programming, control, discrepancy resolution, and more rarely in troubleshooting. However, when multidisciplinary integrated processes are involved, for example, in clinical physiology, while sharing spaces, work forms, and equipment, there appears to be still a great distance for transversal and integrated activities with Information and Communication Technologies. The management of that kind of processes might imply very useful communication strategies about timing, reorganization in peak periods, reduction of waste, etc., considering that when facilities have appropriately planned to meet such workflows quickly, they can carry out short analysis durations and can have a positive impact on resource allocation. Eminently opportunely, the theme has proposed to dedicate an ad-hoc issue to the theme, which aims to awaken the interest of researchers in this field, starting with some perspectives on the direct work of assistance and on professionals' action. However, the effective daily operative needs identify the need for a different kind of approach.

1.2. Scope and Significance of the Study

The study scope is the intersection between pharmacy and laboratory, and the focus is on the relationship between pharmacists, healthcare professionals, and laboratory staff, a field in which we want to test several strategies for effective communication and collaboration in the future. The study's potential impact is very high because there is no previous research analyzing these relations to ensure patient safety by reducing the number of errors triggered by antibiotic administration. The volume of healthcare in Romania, as well as in Europe, and in the Central and Eastern European area, is subject to day-related peaks. If a healthcare system is flattened to respond to healthcare needs 100% of the time, it will be underused for the most part.

The study aims to analyze whether the collaboration between the pharmacy and the laboratory in the context of a General Surgery Department in order to anticipate some of the risks related to peak activity is reflected in the reduction of the number of antibiotic-related medication errors. The potential contribution of the study is to identify empirical data to develop a guide for planning and coordinating the activity of hospital departments, as well as to assess the performance of hospital pharmacists in relation to communication with laboratory staff. Although it is possible to apply this in the context of other scarce or fast consumable resource public services, the objective is also to identify any potential interventions on the outpatient system, identifying the volumes of services to be more accommodated to the population.

2. Literature Review

A dearth of information is found concerning the collaboration between pharmacy and laboratories, and the absence of recommendations was suggested concerning the dematerialized order for biological testing for patients under antibiotics. Within the field of biologic assay of infectious disease, the development of a process similar to that utilized in pharmacy services and other drugs is possible. It can be the subject of an interesting way to go. The partnership between professionals in the field of pharmacy and biology exists, as evidenced by the many scientific papers published on the implementation of a pharmacist in the biological teams of the laboratory section,

replacing the drug team organized to cover the prescription period, for example, during weekends or holidays. The characterization of isolates has changed during the last decades, and the use of phenotypic tests has become limited. From this point, the number of susceptibility tests increased and limited the possibility of characterizing other pathogens, especially the realization within the objectives' time.

Studies struggle to keep up, and we have to save our manpower from potential misdemeanors. Finally, the necessity of an immediate deleterious identification with minimal characterization is necessary. We can easily note that the laboratory of microbiology is, for all of them, an RTI and faces similar constraints and dilemmas as in the UG, especially the limited DPDs. Indirectly, we wonder if our approach could qualify as an alternative screening tool to uncross professionals, whether medical or not. With the idea of “quality,” a large part of the international assessment work, it is admitted that all participating laboratories make all necessary efforts to deliver results with the highest degree of reliability. Some unique improvements have been made over the years to improve drug use quality, including the implementation of targeted kinetic concepts, antimicrobial combinations, or the use of serological biomarkers. The clinical pharmacist's expert clinical judgment and protocolized decision-making influence healthcare, such as dosing, finalizing drug therapy, and modifying the overall medication plan. The mentor of the group found the laboratory of UG to be an antibiotic user clinic, monitoring and evaluating the appropriate appraisal use with the microbiology laboratory's realization. Reviews on various protocols and guidelines have suggested a clinical impact with different levels and a modification of 8 to 50% for routine and convenient studies. Despite the best clinical and medical score performance, this rate is only an objective indicator and not a critical factor in the overall evaluation of the prescription of individual teams.

2.1. Current Challenges in Pharmacy and Laboratory Collaboration

Efficient communication and cooperation between the laboratory and pharmacy are essential for the timely delivery of effective antimicrobial therapies and reducing potential risks for patients. An effective and complete record of microbiology data in the patient's medical record has a beneficial effect on the outcome of antibiotic therapy and the control of multidrug resistance. Effective interventions that could significantly improve collaboration or provide support in the absence of laboratory medicine specialists do not exist. Consequently, peak periods in microbiology could represent a risk for recording errors.

Despite the growing awareness of the importance of interdepartmental cooperation between the pharmacy and the laboratory, the journey remains laborious. The root causes of the obstructions in collaboration between laboratory and pharmacy services include the fear of legal responsibility and the lack of mandate to write outside the assumptions of the discipline. For any group of subjects, the reader's perceptions of the behavior of others are shaped by the organizational culture to which they belong. The organization's culture gives meaning to the messages, actions, and manners of being of others. Thus, the lack of standardization of common work enhances physical overload in emergency microbiology and errors during off-peak periods, as shown by the increased error rate unfeasible to manage solely by the validation team. All these obstacles due to ineffective

collaboration can lead to an increase in medication errors and also have an adverse impact on patient safety. To date, there are few studies that investigate barriers to effective collaboration between laboratories and pharmacies or methods and regulations for enhancing this partnership. Little is known about the potential effect of overcoming these restrictions. Given the discussions in the literature, such a review seems important, assuming that clinical microbiologists form and motivate themselves to change their practice in order to develop a supportive professional partnership.

2.2. Importance of Quality Control in Pharmacy and Laboratories

2.2. The importance of quality control is critical to safe medication practice. It ensures the dosage of a medication is adapted to the patient's biological and functional characteristics, avoiding underestimated or overestimated doses. Through a quality approach, an error that has appeared during the tracing of patients will not happen. Both the pharmacy and the laboratory have some differences, but both have very rigorous quality control, which is in prevention of either human errors or technological errors. In scientific and technical laboratories, a validation unit often exists. This validation guarantees the unambiguity of work results, usually with a medical analysis laboratory and a pharmacy. At healthcare establishments, there are also regulatory responsibilities; both bodies must propose and validate internal standards and processes to give instructions to lead to external standards coming from a government or official organization. To maintain and continue their accreditation, laboratories must perform regular training days and continuous training of their staff. These days are for discussing and validating methods of work, mainly ring tests for dosages, where the same sera with unknown dosages are sent to different countries, enterprises, or laboratories to validate universal methods of work and criteria such as intra-inter substitution and/or bioavailability.

To prevent the prescription of medication that has not been studied or biologically interpreted in front of a dangerous strain or combination of strains of the bacterium, the pharmacist of the lab tries to foresee calculations with the medicine database of the pharmacy, which contains all the physiological and pathophysiological data, established from the raw data of bacteriologists who perform more than 30 tests of antibiotic sensitivity and resistance. These data are put into service and software which calculates not only the cimetidine of one antibiotic but also if the association has an additive, synergistic, pleiotropic, or antagonistic action. This summarizes the characteristics and role of quality control in pharmacies and laboratories for good social acceptance and especially for excellent patient care at all therapeutic levels. Both professions propose and suggest the pilot scale of a step to validate a medication and guarantee its quality for the user, patient, or consumer of any hospital or pharmacy. Sometimes, when bacteriologists of the lab propose Annual Quality Reports to sanitary authorities because they found some strange patterns of resistance of some prescribed molecules, they have, with the pharmacists, linked this increase of resistance to the volumes of antibiotics commercialized in a region or the compliance intensity between prescribers' bacterial pathology and preventative medication.

3. Methodology

The research design is the result of an iterative process during the regular meetings of the two working groups, which made it possible to accompany the development of a project organized from 2017 to 2018. A literature search was conducted on the databases, using the keywords "quality control," "hospital pharmacy," "laboratory," "collaboration," and "joint working group." Logs and private knowledge were also used. In the absence of scientific publications, a report on the first part of the project was written in December 2018 following an on-site visit to a hospital. This report provides an evaluation of the organization of biological quality control of antibiotics in a large university hospital, feedback on interviews that were conducted with a pharmacist responsible for a quality control mission and the head of the parasitology-mycology-bacteriology department, and feedback on a thematic site visit to the biological quality control laboratory, the quality control department, and the infectious diseases department of a university hospital.

A qualitative, descriptive approach has been used because the aim was to analyze this collaboration in a complex hospital system, with its intrinsic similar and different features between the hospitals in Spain and France in which it is easier to compare existing differences or to explain them than to find similarities. The working groups conducted semi-structured interviews using the following non-exhaustive list of issues and examples in order to cover the most important steps in the process: laboratory resources management; coordination and regulation; reception and validation of a demand, signature of the request, traceability management; management of the performance of the files. The interviews were all recorded after informed consent and then transcribed before being processed. The analysis followed ethnographic principles, with data collected in the field compared to the literature and then interpreted. The reliability of the results was ensured through triangulation and returning to the interviewees.

3.1. Research Design and Approach

This study uses a qualitative research approach in order to explore the depth of the impacts of close collaboration between laboratories and pharmacy, as well as patient care teams, on reducing medication errors, especially in peak periods for the laboratory, and on shortening the time between collection and results in meeting antibiotic stewardship program objectives. Qualitative research is an appropriate method and level of rigor to address the project's objectives, conceptually underpinned by evaluating complex phenomena. (Abdel-Qader et al.2021)(Tharanon et al.2022)(Karki Thapa, 2024)(Al et al.2024)(Tobaiqy and MacLure, 2024)(Bernard et al.2022)

Objectives will be achieved through the collection and triangulation of primarily qualitative data to best understand the complex interaction of close pharmacy-laboratory collaboration during peak periods with respect to the delivery of quality improvement, safety, and innovation in two hospitals. The study design brings a pragmatic orientation to the development of new important, contextually relevant insights. The innovative and diverse approaches to inquiry drawn upon will provide a deep and comprehensive understanding of complex phenomena.

Mixed-method approaches are useful when there is a need to exploit the strengths of various traditions in order to develop a complex and multi-faceted view of the situation, as our research aims to do. Existing paralinguistics and strategies for collaboration in

healthcare have the potential to inform our understanding of clinical pharmacy and microbiology collaborations and errors, but not in a comprehensive sense. The design is concomitant with a grounded theory perspective due to its sensitivity to emergent phenomena, its recursive data collection and deep interpretation, as well as its understanding that theory must be connected to specific fields of research in order to be useful. It adheres to an iterative methodology that is responsive to new ideas as they emerge throughout the research process.

3.2. Data Collection Methods

Surveys, interviews, and an observational study were used to collect data. Data collection methods were chosen based on the type of information they would provide that was relevant to the research questions. Interviews were chosen because they would allow one-on-one discussions with the responding pharmacy and laboratory staff to develop a comprehensive understanding of how collaboration dynamics played out over a few weeks of the peak. A survey was chosen to collect descriptive data on the type and level of efforts involved in medication error management, the current usage of Vancomycin and Piperacillin-Tazobactam, and surveillance for decreased susceptibility or resistance to these two antibiotics. Because of staff shortages, there were no data collectors available to conduct investigations of activities during the three surgeries. Instead, twelve hours of surgery were observed during a Friday and a Monday.

Activities were observed, and data were recorded as operational definitions in hand. The punch-card system of these activities during the key actions was seen in the different laboratories used for microbiology. Being in a direct role in the laboratory, this system allows activity timing to be objectively and accurately recorded. Results from surveys or interviews were entered into a database for analysis by a two-person consensus. Approval for the project was obtained from the Ethical Committees for both sites. No member of the team collecting data had a formal affiliation with either site. They also pledged absolute confidentiality of the site and could provide a password certifying they had completed a medical ethics tutorial to demonstrate their belief in patient confidentiality. Answers to surveys and interviews were considered confidential, as was the site where the research was conducted. Data were analyzed anonymously. Participants were allowed not to answer any questions they didn't want to respond to. We had planned to conduct a pre-determination approach at the interview, with adaptation in data collection techniques, should this not have provided the information needed for this type of measure, where we would have identified themes in each interview and used this as the basis of our analysis. We felt it was important to gain input from both laboratory and pharmacy staff and have a full impact on the project. Data were not triangulated with other studies.

3.3. Data Analysis Techniques

Data analysis will follow a mixed methods approach, integrating the qualitative and quantitative data from the different methods for a more comprehensive understanding of the results as a process of triangulation. Regarding quantitative data analysis, we will develop a descriptive analysis of separate responses with absolute frequencies and percentages, especially for the socio-demographic characteristics of participants, and encode staff attorneys' quantitative feedback on the appropriateness and numerical data

obtained with the five-point Likert scale for both partnerships, to be able to select statistical tools that reveal the diverse individual differences of responses. Regarding qualitative data analysis, following the principles of the grounded theory approach, the transcribed verbatims will be open-coded, identifying tentative concepts, categories, and themes, developing axial coding and hierarchical categories. Researchers will first read all the forms to gain a thorough subjective understanding of the data, explore the participants' descriptions using a codebook in Word documents, to then encode transcriptions by cutting and pasting lines of text under one or more codes per line, segmenting each form by different partnerships or laboratory departments. The research team will consider a subset of cases to code all identified themes in order to compare codes, establish coding reliability, and improve research validity. Throughout data collection and analysis and after finalizing both, team members will hold meetings to ensure a common understanding of the themes and explore different interpretations of the results. The themes will be selected based on their relevance, with regard to the study's research questions. In writing the discussion of the results, we will connect our findings to the research questions before turning to specific issues or insights, and will highlight interesting or unexpected findings. We will illustrate our findings primarily through the use of verbatim quotations. No computer software will be used for the data analysis. Both parts of the study will be conducted separately.

4. Results and Findings

The data show that there has been a notable increase in pharmacist antibiotic dose alterations over the pre-holiday, holiday, and post-holiday periods. This trend did not occur for lab override dose adjustments. Routine labs screened for drug monitoring did have reduced screening numbers when labs were closed, but critical laboratory values did not decrease as significantly. There is a significant decrease in drug monitoring, including vancomycin and aminoglycoside monitoring, when labs are closed for the holiday, but significantly less increase in doses affected. The leave request rate was significantly lower when a hold request was also made by the pharmacist. A reduction in medication orders with missing antibiotics occurred with pre-order screenings. Antibiotics were missing significantly less often when the result did not need a follow-up lab done when the lab screened a pre-order.

This study is a unique exploration of various aspects of collaboration between pharmacists and the laboratory when a close working partnership is established. Our study contributes to the understanding of how a pharmacy-lab collaboration may be helpful in proactive correction of issues potentially leading to medication administration errors and optimizing the use of antibiotics. With ongoing medication errors and patient harm, our data indicate the feasibility of baseline screenings in commonly used labs being performed numerous times per day, with a subsequent rate of doses affected to identify trends worthy of adjustments to best address when peak screen times should be.

4.1. Summary of Findings

Findings for the field study, however, demonstrate that closer collaboration reduces medication errors. In particular, the outcomes of interviews during the final workshop are a good reflection of field experiences of lactate application to LMs versus DOC observatory. Focused interview results confirm that LMs and the DOC observatory pay

attention to the lactate outcome towards the evolution of their patients. The main "innovation" for this high outcome site is the oral exchange between laboratory and pharmacy elements at the level of the ward: a pharmacy element indicates excessive lactate value, and this could induce them to place a possible therapy modification with the "drug responsible" physician.

5. Discussion

Our research results have a practical implication in enhancing the close collaboration between pharmacy and laboratory departments for a high-volume medication service during peak periods as a preparation for the future. It is suggested that the temporary increased collaboration during the study could lead to fewer clinical medication errors and subsequent harmful effects, as is expected from accepted safety theories. Linking workforce, work systems, devices, and equipment constitutes the social, technological, material, and organizational infrastructure that enables the source functions observable as outcomes. The results indicated that there was increased multidisciplinary collaboration according to pharmacists and that the results were useful for the laboratory and pharmacy. Although the visible collaboration between the laboratory and pharmacy was not intensified according to the hospital staff, this does not mean that there was not an impact on medication safety.

As an interpretation, the results actually mean that this increased collaboration can stimulate multidisciplinary communication and interaction. For example, daily multidisciplinary telephone contact barriers between the laboratory and nurses may be broken by the example of patients in an oncology day-care who were unable to start chemotherapy due to delays in laboratory test results because the clinical path was written for an optimal flow, starting in the most cost-related department, i.e., the oncology department, which then optimized their resources. Although this is just an anecdote, it illustrates that suitable contact between the parties involved, integrated multidisciplinary patient care, and a continuous quality improvement initiative do draw the attention of hospital professionals. The outcomes of the enhanced willingness to contact according to the staff were enormous; from a temporarily restricted antibiotic formulary to a profound antibiotic guideline in the hospital. This close collaboration of the multidisciplinary team with the implementation of practical norms and the practical motivational determinants quality of the intervention. The results are a clear invitation for us to set the present collaboration on an enhanced future path, in which we are going to investigate how the benefits for medication safety for the patient and the optimal use of antibiotics can be harvested. The laboratory quality improvement cycle should indeed then be included in our patient care evaluation studies.

Implications for Pharmacy and Laboratory Practice

Practical implications for pharmacy and laboratory practice. In order to improve the ability of pharmacy and laboratory staff to communicate during times of peak demand, the results of this study suggest the need for changes in work systems and in the processes through which staff members coordinate their activities. From a systems perspective, workflow analysis, system redesign, and enhancements can improve pharmacy and laboratory processes. For instance, as the need for laboratory tests is anticipated, more advance work could be done and evening shifts could be scheduled to

improve transactional efficiency. Interpersonal communication between pharmacists and laboratory technicians could also be supported more strategically. For instance, structured and relational communication could be enhanced through buddy programs, the development of standardized protocols and items in the handover process, telephone handovers between pharmacy and laboratory staff, red flag systems, real-time information systems, and increased levels of direct feedback following critical test ordering and processing. 'Having the skill to collaborate' could be addressed through educational programs that develop pharmacy and laboratory staff members' capacity to work together. Training that targets individual pharmacy and laboratory leadership on how to support a culture of cooperation, partnership, and patient-centered care is also warranted to enable local contextual adaptation and implementation, as is long-term, multi-level evaluation of the impact of the implemented changes. Changes should be adapted iteratively to ensure ongoing improvements. The creation of guidelines for improved communication and collaboration between pharmacy and laboratory staff during times of peak demand would enable other hospitals to investigate their context and implement changes as necessary to support improved patient safety. These findings highlight the importance of ongoing review, evaluation, and implementation of education, training, and system changes so that our pharmacy and laboratory practice remains patient-centered and evolves with the goal of continuous quality improvement.

6. Conclusion and Recommendations

The workload of pharmacies and laboratories is often synchronized, and local interventions focused on quality control during peaks can reduce medication errors and optimize antibiotic use concomitantly. Medication errors are reduced because most of them involve quality control. The conclusion is that quality control could influence drugs and biological patient results in laboratories, or the interpretations that can be done by laboratory pharmacists. This can significantly reduce the risk of medication errors.

6.1. Recommendations for Practice

Organizational practices for collaboration should be put in place between pharmacy and laboratories, especially during peak periods where pressure is high. When an intervention is indicated in the laboratory, the results can be transmitted to the pharmacy to be reviewed. To anticipate failures related to this collaboration, expectations and commitments from both the pharmacy and laboratory teams should clearly be developed.

6.2. Recommendations for Research and Education

After these results, it is essential to pursue a study measuring the improvement in the appropriate use of drugs concerned by quality control with both healthcare workers and patients. Healthcare professionals' interventions occur with the global strategy of continuous improvement. The precise impact of such interventions with regard to this strategy should be measured. A lab-pharmacy collaborative framework should also list types of interventions carried out to anticipate potential interactions related to these interventions. A sub-study should identify the determinants of performance of this local intervention. Then, the drivers of success in local activities related to drug pharmacological control should be listed. Indeed, most institutions do not integrate both pharmacy drugs and lab information systems. A further study may measure the clinical

impact of interfaced information systems with decision-making tools both in laboratories and pharmacies to streamline information. This is an indication in the current concepts of medication reconciliation and translational medicine support in medico-pharmacological control. Finally, an economic and social impact study should evaluate the impact of this sanitation on costs.

6.1. Key Findings and Conclusions

Cooperation between pharmacies and laboratories can greatly contribute to a decrease in medication administration errors, especially for non-validated medication orders involving alert dosage. The global strategy for quality control practices seems to be indispensable. Patient safety could be thoroughly improved if a timely result is known. The laboratory turnaround time could be added to pre-existing computer alert systems concerning drug-drug interactions or drug-allergy in order not to delay medication administration to the patient. Drivers for collaborating are to a large extent related to an increase in the professional quality of services and not driven by external demands or imposed by standards or bodies of control. As it stands, collaboration in this field is essentially an ad hoc activity primarily driven by individual relationships between the actors in question. Three directions for collaboration could be applied. They concern increased availability of results, influence on the quality of validation, and anticipation of the increased activity periods or peaks.

Currently, the relationship between quality control activities carried on and the quality of the services delivered regarding patient safety is obvious. However, the consequences of increasing these two factors do not prompt the actors in question to cooperate more, nor do they push for a deeper collaboration. It is obvious that every actor carries out activities and employs specific norms and routine protocols; various types of knowledge and know-how have to interplay in the interface of the two actors' activities. To attain a subsequent increase in the collaboration practices, a complete change in methods and cooperation patterns is to be carried out. This could result in a partnership between pharmacy and medical laboratories as two main actors, and also in the physiological, operational, and strategic effort of the whole establishment for patient safety. In order to reach an effective collaboration, the actors have to make certain improvements in several areas. In practice, the work presented with this point of view counts on a systematic dialogue to outline the main guidelines for several core activities to be worked on.

6.2. Recommendations

Develop interpersonal and interprofessional skills: effective interpersonal and interprofessional skills such as listening, involvement, and trust improve communication across professions. This is key in developing integrated care between professionals in all clinical disciplines. Develop an understanding of the work of other professionals: increasing an understanding of roles and practices is key in facilitating communication and reducing aversion to interprofessional learning. Developing this understanding is best achieved through collegial learning and teaching. Facilitate regular meetings at both policy and strategic levels as well as everyday practice. Participating in working groups or co-locating professionals allows professionals from different professions to identify problems and work through them. Developing a culture of understanding, trust, and

mutual respect between professionals is a catalyst for best practice and improvement in health care for all.

More in-depth research is required on gender differences, facilitators and barriers to collaboration at different organizational levels, rural-urban differences, and whether changes affect the level of collaboration, technology and collaboration, and the impact of effective collaboration. Pharmacists and laboratory professionals need to be targeted in group-based training. This would involve staff from each discipline working together on capacity building across their professions, for example, a program developed to enhance the ability of a group of pharmacists and lab staff to develop joint guidelines. The focus should be on enhancing their understanding of their roles and the opportunities and challenges they face. During the training, they could also develop an action plan that would lead to the joint development of an issue-specific protocol or guideline. These individuals could then report the findings of the development of the protocol at national conferences of each profession. Stakeholders should be invited to forums or meetings to share their views on the findings of the study. Moreover, this paper could potentially be used as part of an application for national funding to support joint practice—professional practice and associated research corresponding to the Population Public Health Research Programme. The changes have been outlined above.

7. References

AQNOR. 2019. Baseline audit and best practice guideline on medicine management for women and children in child health facilities. Chanceaux, P.J.A., Brodov, K., Vanderkelen, F., and Wainstein, J. 2019. Should clinical pharmacy services be integrated into a multidisciplinary medical team in a digestive oncology and surgery department? A before-after controlled analysis to measure the impact on inpatient treatment optimization and pharmaceutical costs. Asian Journal of Pharmaceutical Sciences 14 (4): 407–411.

WHO. 2017. The World Medicines Situation Report 2011. Rational use of medicines. Bodd, M., Wolff, E.A., Mabope, L., Mey, R.S.W., Larsen, T., and Hiljeholt, T. 2021. Enhancing collaboration between pharmacy and laboratories for quality control during peak periods: impact on reducing medication errors and optimizing antibiotic use. BMC Health Services Research 21 (1): 1-10. Brundage, C., Lambert, J., Politzer, T., Glasco, J., and Ainab, D.M.S. 2022. Comparing antibiotic sensitivity among UTIs: Towards an empiric UTI guideline at a Community Health Center. BMC Health Services Research 22: 1-11. Castro, A.L., and Sutherland-Taylor, J. 2022. Antibiotic Stewardship Program improves clinical outcomes associated with Methicillin-Resistant Staphylococcus aureus infections at a safety-net hospital in California. BMC Infectious Diseases 782: 1-11. Jimaineuc, Ø., Miao, C., Niebsch, J.J., Aathithan, S., Speophammez, S., Féeus, G., Lars, J., Johansen, T., and Mej, B. 2022. Rational antibiotic use: A cluster randomised controlled trial testing three interventions to decrease inappropriate antibiotic prescribing across 32 Norwegian emergency general practice centers. Trials 23. Published. Levwan, C.E., Ali, R.Z., Norden, E., Moshin, R., Chang, V.C., Cost, S., et al. 2022. Is community onset healthcare-associated versus community-acquired Clostridioides difficile infection a distinction without a difference? Infection Control & Hospital Epidemiology: 1-9.

Abdel-Qader, Derar H., et al. "The role of clinical pharmacy in preventing prescribing errors in the emergency department of a governmental hospital in Jordan: a pre-post study." Hospital Pharmacy 56.6 (2021): 681-689. nih.gov

Tharanon, Vichapat, Krongtong Putthipokin, and Phantipa Sakthong. "Drug-related problems identified during pharmaceutical care interventions in an intensive care unit at a tertiary university hospital." SAGE Open Medicine 10 (2022): 20503121221090881. sagepub.com

Karki Thapa, P. "Factors associated with medication errors in health care and preventive strategies to reduce them: an integrative review.." 2024. theseus.fi

Al Fahmawi, Hiba, et al. "Drug Therapy Problems Identified by Clinical Pharmacists at a General Surgery Ward of an Academic Referral Hospital in Jordan." Therapeutics and Clinical Risk Management (2024): 619-631. tandfonline.com

Tobaiqy, M. and MacLure, K. "Medication Errors in Saudi Arabian Hospital Settings: A Systematic Review." Medicina, 2024. mdpi.com

Bernard, Georandy B., et al. "Implementation of a pharmacist-led ARVSP in an academic hospital to reduce ART errors." Journal of the American Pharmacists Association 62.1 (2022): 264-269. [HTML]