
Bridging the Gap: Improving Communication between Pharmacists and Physicians to Prevent Adverse Events

Fahad Nabi¹, Mohd Altaf Dar^{2*}, Abrar Bashir Malik³

^{1,2*,3}Department of Pharmacology, CT Institute of Pharmaceutical Sciences, PTU, Jalandhar Punjab, India.

Corresponding Email: ^{2*}daraltaf490@gmail.com

Received: 01 November 2022 **Accepted:** 16 January 2023 **Published:** 01 March 2023

Abstract: *When it comes to reducing adverse drug events (ADEs) and ensuring that patients receive the best possible care, it is crucial for chemists and physicians to communicate effectively with one another. This paper investigates the current status of communication between chemists and physicians, the impact that it has on the safety of medication, and the tactics that can be used to improve this collaboration. This study investigates the ways in which enhanced communication can help reduce medication errors, make complex drug regimens easier to manage, and address issues that are related to drugs. The review also covers the obstacles that stand in the way of good communication, such as variations in professional roles, limitations on workload, and communication skills. Some of the strategies that can be utilised to overcome these obstacles include the implementation of integrated electronic health records (EHRs), the establishment of formal communication protocols, and the promotion of interdisciplinary teamwork. With improved communication, the synergy that exists between physicians and chemists has the potential to result in patient treatment that is both safer and more effective.*

Keywords: *Pharmacist-Physician Communication, Adverse Drug Events, Medication Safety, Interdisciplinary Collaboration.*

1. INTRODUCTION

It is essential for physicians and chemists to communicate effectively in order to maximise the quality of treatment provided to patients and to reduce the number of adverse drug events (ADEs). The term "adverse drug reactions" (ADEs) refers to a wide variety of unfavourable outcomes because of the use of medication. These outcomes include adverse drug responses, pharmaceutical errors, and therapeutic failures. The risk of adverse drug reactions (ADEs) has increased as a result of the complexity of current pharmacotherapy, which is characterised by polypharmacy and individualised treatment plans. This highlights the

necessity for robust communication techniques among these specialists in the healthcare industry. The responsibilities that chemists and physicians play in the process of pharmaceutical use are complementary to one another. It is the responsibility of physicians to diagnose illnesses and prescribe treatments, while it is the responsibility of chemists to guarantee that pharmaceuticals are used in a manner that is both safe and effective [1-3]. The effective collaboration between these two professions has the potential to improve therapeutic outcomes, decrease the incidence of adverse drug reactions (ADEs), and increase the safety of medications. Even though this partnership is extremely important, there are still obstacles that prevent chemists and physicians from effectively communicating with one another. The process of exchanging vital information that is important for the prevention of adverse drug effects (ADEs) might be hampered by differences in professional positions, communication styles, and workload restrictions. Within the scope of this review, the current condition of communication between chemists and physicians is investigated, problems are identified, and measures are proposed to enhance collaboration for the purpose of enhancing patient safety [3-5].

2. RELATED WORKS

There is a direct correlation between the quality of communication between chemists and physicians and the safety of some medications. According to a number of studies, better communication has the potential to lessen the number of medication errors that occur and to enhance the outcomes for patients. For instance, research has shown that when chemists and physicians work together in an efficient manner, there is a reduction in the number of medication inconsistencies and harmful drug interactions. Effective communication is one of the most important factors in ensuring that the patient's drug therapy is in line with their entire treatment plan. Pharmacists have the ability to give physicians with crucial information into drug interactions, side effects, and optimum dosing, which can be extremely important when it comes to making decisions regarding treatment. In the opposite direction, physicians are able to provide context regarding the patient's condition and treatment goals, which enables chemists to provide recommendations that are properly informed. According to the findings of a study, multidisciplinary teams that included both physicians and chemists reported a lower incidence of adverse events and medication errors when compared to teams that performed less frequent collaboration. This demonstrates the significance of routine communication and collaborative decision-making in the prevention of adverse drug reactions (ADEs) and the enhancement of patient care [5-7]. A number of obstacles can make it difficult for chemists and physicians to communicate effectively with one another. Differences in professional duties, communication styles, and workload limits are some of the obstacles that stand in the way. The responsibilities that chemists and physicians play in patient care are distinct from one another yet complimentary. Generally speaking, the primary focus of physicians is to diagnose diseases and prescribe treatments, whereas the primary interest of chemists is to ensure that pharmaceuticals are used in a manner that is both safe and effective. It is possible that these divergent points of view could result in therapeutic goals and approaches that are not aligned with one another. Knowing and respecting the roles and areas of competence that are specific to each profession is necessary for effective

communication, which can be difficult to do given the variances across the professions. There is a possibility that chemists and physicians have distinct communication styles and preferences, which can have an effect on the interactions between them. While chemists may place a greater emphasis on providing comprehensive information regarding medications, physicians may place a higher priority on efficiency and brevity. These disparities have the potential to result in misunderstandings and the exchange of information that is insufficient. To bridge this gap, it is necessary to modify communication tactics in order to cater to the requirements of both professionals and to make it easier for information to be shared in a clear and succinct manner. It is possible for opportunities for effective communication to be limited when there are high workloads and time restrictions [7-10]. Not only do chemists frequently have to juggle many duties at the same time, but physicians frequently have to deal with hectic schedules that leave them with little time for in-depth conversations. It is possible that these limits will lead to communication that is fragmented and opportunities for collaborative problem-solving that will be overlooked. Finding strategies to include communication into normal practice and streamlining information exchange procedures are two of the obstacles that need to be addressed in order to address workload issues. There are a few different approaches that can be taken in order to enhance the communication that occurs between physicians and chemists. The implementation of integrated electronic health records (EHRs), the establishment of formal communication protocols, and the promotion of interdisciplinary teamwork are all approaches that fall under this category. Utilising integrated electronic health records (EHRs) can make it easier for physicians and chemists to communicate with one another. Electronic Health Records (EHRs) make it possible to retrieve patient information in real time, which may include treatment plans, laboratory findings, and prescription histories. Through this shared access, it is possible to ensure that both physicians and chemists have access to the most recent information, which in turn helps to improve decision-making and reduce the likelihood of prescription errors [10-12]. The provision of tools for documenting and tracking medication-related concerns is another way in which electronic health records can facilitate communication. For instance, electronic health records (EHRs) can be utilised by chemists to record side effects or interactions between medications, which can then be assessed by physicians as a component of the patient's treatment plan. Through this integration, a collaborative approach to drug management is fostered, which in turn improves the overall effectiveness of patient safety. Increasing the efficiency of interactions between chemists and physicians can be accomplished through the establishment of formal communication standards. Regular meetings, standardised reporting formats, and systematic handoffs of patient information are all examples of things that could be associated with protocols. By ensuring that vital information is presented in a way that is both clear and consistent, these protocols assist to reduce the likelihood of misunderstandings and the number of possibilities for collaboration that cannot be taken advantage of [13]. Pharmacists and physicians are able to discuss patient cases, examine treatment plans, and address any problems connected to medicine when they participate in regular interdisciplinary meetings. These meetings can take the form of case conferences or team rounds. Standardising the transmission of information and ensuring that important concerns are brought to light can be accomplished with the use of structured reporting formats, such as medication therapy reviews or warnings regarding drug

interactions. It is beneficial to both chemists and physicians to foster an environment that facilitates interdisciplinary working since it fosters collaboration and mutual respect. Enhancing communication and providing better care for patients can be accomplished by cultivating solid professional relationships and gaining an awareness of each other's roles and contributions. It is possible to improve abilities for effective collaboration and communication through the use of activities that involve team building and training that spans multiple disciplines. As part of these activities, participants may participate in joint workshops, simulations, and collaborative projects that are geared towards enhancing their ability to work together and solve problems. The prevention of adverse drug reactions (ADEs) and the improvement of patient outcomes can be accomplished more efficiently when a collaborative environment is fostered between physicians and chemists [13-20].

3. METHODOLOGY

For this research, a comprehensive search was conducted across various academic databases, including PubMed, Google Scholar, and Scopus, using keywords such as "pharmacist-physician communication," "adverse drug events," "medication safety," and "interdisciplinary collaboration." The selection criteria focused on research and papers that investigated the effects of communication between pharmacists and physicians on medication safety, the obstacles preventing effective communication, and potential improvements in this area. The review aimed to provide a comprehensive understanding of the current state of pharmacist-physician communication and its implications for preventing adverse drug events (ADEs). By analyzing findings from these sources, the review synthesized evidence from recent research and best practices to identify strategies and solutions for improving communication. Effective communication between pharmacists and physicians is crucial for enhancing medication safety and preventing ADEs. Pharmacists and physicians working together can ensure that patients receive the correct medications, appropriate dosages, and necessary information about potential side effects and interactions. This collaboration is essential for optimizing patient outcomes and reducing the risk of medication-related problems. The review highlighted several benefits of effective pharmacist-physician communication. Improved communication can lead to better coordination of care, timely identification and resolution of medication issues, and enhanced patient education. When pharmacists and physicians communicate effectively, they can share critical information about patients' medication histories, allergies, and treatment plans, ensuring a more comprehensive approach to patient care. However, the review also identified significant obstacles to effective communication between pharmacists and physicians. These challenges include time constraints, differences in professional training and perspectives, lack of standardized communication protocols, and limited access to shared patient information. Addressing these barriers is essential to fostering better collaboration and improving medication safety. To improve communication between pharmacists and physicians, the review proposed several strategies. One strategy is to implement standardized communication protocols and tools, such as electronic health records (EHRs) and secure messaging systems, to facilitate the sharing of patient information and medication-related data. Another strategy is to provide joint training and continuing education programs that emphasize the importance of interdisciplinary collaboration and

effective communication skills. The review also emphasized the role of healthcare organizations and policymakers in supporting pharmacist-physician communication. Institutions can create an environment that encourages collaboration by promoting team-based care models and providing resources and incentives for effective communication. Additionally, policies that recognize and support the collaborative roles of pharmacists and physicians in patient care can further enhance their ability to work together effectively. The findings of the review underscore the significant impact that effective pharmacist-physician communication can have on medication safety and patient outcomes. By working together, pharmacists and physicians can identify potential medication issues before they lead to ADEs, ensure that patients receive appropriate and safe therapies, and provide comprehensive patient education. The review highlights the importance of effective communication and collaboration between pharmacists and physicians in enhancing medication safety and preventing ADEs. Addressing the barriers to effective communication and implementing strategies to improve collaboration are essential for optimizing patient care. The findings of this review emphasize the need for continuous research, innovation, and support in this area to ensure that healthcare providers can work together effectively to provide the best possible care for their patients.

4. RESULTS AND DISCUSSION

It is necessary for there to be effective communication between chemists and physicians in order to reduce the incidents of medication errors and to improve the outcomes for patients. When chemists and physicians work together in an efficient manner, the safety of medications is improved, and the number of adverse events is decreased, according to research that has been conducted repeatedly. As an illustration, research has shown that multidisciplinary teams consisting of both physicians and chemists have a lower incidence of medication inconsistencies and harmful drug interactions. The feedback that chemists provide regarding drug interactions, dose modifications, and monitoring requirements is extremely valuable and can help physicians make more informed decisions regarding therapy [20-22]. Additionally, physicians provide pharmacists with insights about the clinical status of the patient, treatment goals, and overall management plan, which enables pharmacists to tailor their recommendations to the patient's specific needs. It is through the sharing of information that the drug therapy is optimised and brought into alignment with the requirements of the patient. There has been a correlation between the incorporation of chemists into healthcare teams and increased drug adherence, decreased hospitalisations owing to medication-related difficulties, and improved treatment of chronic illnesses. For instance, a study conducted discovered that collaborative care models that included both physicians and chemists led to a considerable reduction in the number of occasions when patients were readmitted to the hospital and prescription errors. These findings highlight the significance of excellent communication in attaining positive patient outcomes and improving the safety of medication administration. When chemists and physicians are unable to effectively communicate with one another, it can have a negative influence on the quality of care provided to patients and the avoidance of adverse drug reactions (ADEs) [22-25]. The professional roles and obligations of chemists and physicians are unique from one another, which can occasionally

result in disparities in the therapeutic procedures and objectives that are pursued. Pharmacy professionals are largely concerned with the management and safety of medications, whereas physicians are mostly concerned with the diagnosis of illnesses and the prescription of therapies. It is possible for these divergent points of view to generate difficulties in terms of communication and teamwork. It is vital to cultivate mutual understanding and respect for the knowledge and contributions of each profession in order to overcome this barrier. It is possible for physicians and chemists to have distinct communication styles and preferences, which might have an impact on their relationships with one another. While chemists may place a greater emphasis on providing comprehensive information regarding medications, physicians may place a higher priority on efficiency and brevity. These disparities have the potential to result in misunderstandings and the exchange of information that is insufficient. When it comes to increasing collaboration, it is essential to modify communication tactics so that they can meet the preferences and requirements of both professionals. The use of language that is clear and brief, the provision of summaries of crucial issues, and the active listening to each other's points of view are all examples of techniques that could be utilised. There may be fewer opportunities for efficient contact between chemists and physicians due to the extensive workloads and time restrictions that they face. There is a possibility that fragmented or rushed encounters will occur as a consequence of busy schedules and competing priorities, which might have an impact on the quality of information transmission. The integration of communication into normal practice and the simplification of information-sharing procedures are both needed in order to meet this difficulty. It is possible to allow interactions that are more efficient and effective by implementing tools such as electronic health records (EHRs) and standardised communication protocols [25-27]. The communication between chemists and physicians can be improved through a number of different ways, which will ultimately lead to an increase in medication safety and the prevention of adverse drug reactions (ADEs). Integration of electronic health records (EHRs) has the potential to greatly enhance communication between physicians and chemists. It is possible to obtain patient information in real time using electronic health records (EHRs), which may include treatment plans, laboratory findings, and medication histories. This shared access guarantees that both professionals have access to the most recent information, which is essential for making decisions based on accurate information and avoiding adverse drug effects (ADEs). In addition, electronic health records (EHRs) facilitate communication by providing tools for documenting and monitoring medication-related concerns. For instance, electronic health records (EHRs) can be utilised by chemists to document side effects or interactions between medications, which can then be assessed by physicians as a component of the patient's treatment plan. Through this integration, a collaborative approach to drug management is fostered, which in turn improves the overall effectiveness of patient safety. Increasing the efficiency of interactions between chemists and physicians can be accomplished through the establishment of formal communication standards. Regular meetings, standardised reporting formats, and systematic handoffs of patient information are all examples of things that could be associated with protocols. By ensuring that vital information is presented in a way that is both clear and consistent, these protocols assist to reduce the likelihood of misunderstandings and the number of possibilities for collaboration that cannot be taken advantage of [27-30]. Pharmacists and physicians are able to discuss

patient cases, examine treatment plans, and address any problems connected to medicine when they participate in regular interdisciplinary meetings. These meetings can take the form of case conferences or team rounds. Standardising the transmission of information and ensuring that important concerns are brought to light can be accomplished with the use of structured reporting formats, such as medication therapy reviews or warnings regarding drug interactions. It is beneficial to both chemists and physicians to foster an environment that facilitates interdisciplinary working since it fosters collaboration and mutual respect. Enhancing communication and providing better care for patients can be accomplished by cultivating solid professional relationships and gaining an awareness of each other's roles and contributions. It is possible to improve abilities for effective collaboration and communication through the use of activities that involve team building and training that spans multiple disciplines. As part of these activities, participants may participate in joint workshops, simulations, and collaborative projects that are geared towards enhancing their ability to work together and solve problems. The prevention of adverse drug reactions (ADEs) and the improvement of patient outcomes can be accomplished more efficiently when a collaborative environment is fostered between physicians and chemists [30-37].

5. CONCLUSION

One of the most important things that can be done to minimise adverse drug events (ADEs) and ensure that patients receive the best possible treatment is to improve communication between chemists and physicians. Enhancing pharmaceutical safety, lowering the likelihood of medication errors, and improving therapeutic outcomes are all benefits that can be achieved by effective collaboration between these two professions. Enhancing collaboration requires addressing hurdles to communication, such as variations in professional responsibilities, communication styles, and workload limits. It is essential to address these barriers through conversation. In order to overcome these obstacles and increase the efficiency of interactions between chemists and physicians, it is possible to use strategies such as the implementation of integrated electronic health records (EHRs), the establishment of formal communication protocols, and the promotion of multidisciplinary professional collaboration. When there is a gap in communication between chemists and physicians, they are able to collaborate more effectively in order to reduce adverse drug reactions (ADEs), maximise the effectiveness of pharmacological therapy, and enhance patient safety. When it comes to improving the quality of care and delivering better outcomes for patients, the synergy that exists between these healthcare workers is an extremely important factor.

6. REFERENCES

1. Zehravi M, Maqbool M, Ara I. Polycystic ovary syndrome and infertility: an update. *International journal of adolescent medicine and health*. 2021 Jul 22; 34(2):1-9.
2. Lihite RJ, Lahkar M, Das S, Hazarika D, Kotni M, Maqbool M, Phukan S. A study on adverse drug reactions in a tertiary care hospital of Northeast India. *Alexandria journal of medicine*. 2017 Jul 11; 53(2):151-6.

3. Zehravi M, Maqbool M, Ara I. Correlation between obesity, gestational diabetes mellitus, and pregnancy outcomes: an overview. *International Journal of Adolescent Medicine and Health*. 2021 Jun 18; 33(6):339-45.
4. Maqbool M, Bekele F, Fekadu G. Treatment strategies against triple-negative breast cancer: an updated review. *Breast Cancer: Targets and Therapy*. 2022 Jan 11:15-24
5. Rasool S, Maqbool M. An overview about *Hedychium spicatum*: a review. *Journal of Drug Delivery and Therapeutics*. 2019 Feb 15; 9(1-s):476-80.
6. Zehravi M, Maqbool M, Ara I. Depression and anxiety in women with polycystic ovarian syndrome: a literature survey. *International Journal of Adolescent Medicine and Health*. 2021 Aug 23; 33(6):367-73.
7. Maqbool M, Gani I, Dar MA. Anti-diabetic effects of some medicinal plants in experimental animals: a review. *Asian Journal of Pharmaceutical Research and Development*. 2019 Feb 15; 7(1):66-9.
8. Zehravi M, Maqbool M, Ara I. Polycystic ovary syndrome and reproductive health of women: a curious association. *International journal of adolescent medicine and health*. 2021 Apr 21; 33(6):333-7.
9. Mohd M, Maqbool M, Dar MA, Mushtaq I. Polycystic ovary syndrome, a modern epidemic: an overview. *Journal of Drug Delivery and Therapeutics*. 2019 May 15; 9(3):641-4.
10. Maqbool M, Fekadu G, Jiang X, Bekele F, Tolossa T, Turi E, Fetensa G, Fanta K. An up to date on clinical prospects and management of osteoarthritis. *Annals of Medicine and Surgery*. 2021 Dec 1; 72:103077.
11. Majeed A, Bashir R, Farooq S, Maqbool M. Preparation, characterization and applications of nanoemulsions: An insight. *Journal of Drug Delivery and Therapeutics*. 2019 Mar 15; 9(2):520-7.
12. Zehravi M, Maqbool M, Ara I. Healthy lifestyle and dietary approaches to treating polycystic ovary syndrome: a review. *Open Health*. 2022 May 2; 3(1):60-5.
13. Maqbool R, Maqbool M, Zehravi M, Ara I. Menstrual distress in females of reproductive age: a literature review. *International journal of adolescent medicine and health*. 2021 Jul 22; 34(2):11-7.
14. Ara I, Maqbool M, Fekadu G, Hajam TA, Dar MA. Pharmaceutical significance of *Nigella sativa* L., a wonder herb. *Journal of Applied Pharmaceutical Sciences and Research*. 2020; 3(4):04-13.
15. Maqbool M, Nasir N, Mustafa S. Polycystic in ovarian syndrome and its various treatment strategies. *INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES*. 2018 Sep 1; 5(9):8470-8.
16. Maqbool M, Zehravi M, Maqbool R, Ara I. Study of adverse drug reactions in pulmonary medicine department of a Tertiary care hospital, Srinagar, Jammu & Kashmir, India. *CELLMED*. 2021; 11(2):8-1.
17. Ara I, Maqbool M, Bukhari B, Ara N, Hajam TA. Present status, standardization and safety issues with herbal drugs. *International Journal of Research in Pharmaceutical Sciences and Technology*. 2020 May 18; 1(3):95-101.

18. Ara I, Maqbool M, Gani I. Reproductive Health of Women: implications and attributes. *International Journal of Current Research in Physiology and Pharmacology*. 2022 Nov 28:8-18.
19. Zehravi M, Maqbool R, Maqbool M, Ara I. To Identify Patterns of Drug Usage among Patients Who Seek Care in Psychiatry Outpatient Department of a Tertiary Care Hospital in Srinagar, Jammu and Kashmir, India. *Journal of Pharmaceutical Research International*. 2021 Jun 10; 33(31A):135-40.
20. Maqbool M, Javed S, Bajwa AA. Assessment OF pain management IN postoperative cases using different scales and questionnaires. *INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES*. 2019 Jan 1; 6(1):983-7.
21. Ara I, Maqbool M, Zehravi M. Psychic consequences of infertility on couples: A short commentary. *Open Health*. 2022 Jan 1; 3(1):114-9.
22. Bashir R, Maqbool M, Ara I, Zehravi M. An Insight into Novel Drug Delivery System: In Situ Gels. *CELLMED*. 2021; 11(1):6-1.
23. Zehravi M, Maqbool M, Ara I. Teenage menstrual dysfunction: an overview. *International Journal of Adolescent Medicine and Health*. 2022 Sep 19; 35(1):15-9.
24. Ara I, Zehravi M, Maqbool M, Gani I. A review of recent developments and future challenges in the implementation of universal health coverage policy framework in some countries. *Journal of Pharmaceutical Research & Reports*. SRC/JPRSR-131. DOI: doi. org/10.47363/JPRSR/2022 (3). 2022; 127.
25. Maqbool M, Shabbir W, Aamir S. Adverse events of blood transfusion and blood safety in clinical practice. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8254-9.
26. Maqbool M, Naeem A, Aamer S. Diabetes mellitus and its various management strategies in practice. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8163-+.
27. Maqbool M, Tariq S, Amjad S. Prescribing practices in pediatrics and drug utilization studies promoting pediatric health. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8070-6.
28. Maqbool M, Ikram U, Anwar A. Adverse drug reaction monitoring and occurrence in drugs used in pulmonary disorders. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8060-5.
29. Maqbool R, Maqbool M, Zehravi M, Ara I. Acute neurological conditions during pregnancy and their management: a review. *International Journal of Adolescent Medicine and Health*. 2021 Aug 23; 33(6):357-66.
30. Zehravi M, Maqbool M, Ara I. An overview about safety surveillance of adverse drug reactions and pharmacovigilance in India. *The Indian Journal of Nutrition and Dietetics*. 2021 Jul: 408-18.
31. Maqbool M, Zehravi M. Neuroprotective role of polyphenols in treatment of neurological disorders: A review. *Interventional Pain Medicine and Neuromodulation*. 2021 Dec 31; 1(1).
32. Maqbool M, Ara I, Gani I. The Story of Polycystic Ovarian Syndrome: A Challenging Disorder with Numerous Consequences for Females of Reproductive Age. *International Journal of Current Research in Physiology and Pharmacology*. 2022 Nov 28:19-31.



33. Maqbool M, Gani I. Utilization of statins in reducing comorbidities of diabetes mellitus: A systematic review. *Journal of Pharmacy Practice and Community Medicine*. 2018; 4(4).
34. Maqbool R, Maqbool M, Zehravi M, Ara I. Acute neurological conditions during pregnancy and their management: a review. *International Journal of Adolescent Medicine and Health*. 2021 Aug 23; 33(6):357-66.
35. Maqbool M, Tariq S, Amjad S. Prescribing practices in pediatrics and drug utilization studies promoting pediatric health. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8070-6.
36. Maqbool M, Naeem A, Aamer S. Diabetes mellitus and its various management strategies in practice. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8163-+.
37. Maqbool M, Shabbir W, Aamir S. Adverse events of blood transfusion and blood safety in clinical practice. *Indo American Journal of Pharmaceutical Sciences*. 2018 Aug 1; 5(8):8254-9.