What Recent Scientific and Technological Developments Mean for the Future of Pharmacy

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Abstract — We shall begin this chapter by discussing the current state of pharmacy practice research and its potential future directions. The background is then established by a discussion of major concepts from the research approach used in this chapter. This includes, but is not limited to, changes in demographics, advances in medicine, the pharmacy's institutional role, and customer preferences. Alterations in the pharmaceutical market and customer behavior are two further instances. In addition, it highlights the significant development in pharmacy research throughout the previous several decades. The capacity to define and evaluate the effects of pharmaceuticals, the diversity of patient cultures, and the interprofessional collaboration and partnership with patients are all examples of developments that fall within this category. In the article's last paragraph, the authors focus on the methods that will likely be employed in future research on pharmacy practice. It is becoming more usual to work with large and complicated data sets; conducting research using electronic health records has unique methodological

challenges; and academics studying pharmacy practice use a diverse range of methodologies that supplement one another.

I. INTRODUCTION

Most people observe a person behind a counter selling prescriptions and providing occasional advice on prescription and over-the-counter (OTC) treatments. They may also remind clients about preventive screenings or flu shots. Pharmacists can do more. To assist patients, maximize their therapies, they learn how to interpret test results, do physical exams, and deliver immunizations. The Future of Health emphasizes home and community-based care. This tendency will assist chemists, the most accessible and renowned medical specialists. (Rabats, 1998) The epidemic gave chemists additional patient care opportunities. The Department of Health and Human Services (HHS) now allows chemists to prescribe and provide Covid-19 tests and immunizations to children under 18. Thus, pharmacists, interns, and pharmacy technicians were on the front lines of the COVID-19 pandemic, testing, vaccinating, and educating the public while continuing business. These efforts enhanced the public's opinion of pharmacists and reduced strain on other health care systems, allowing pharmacists to reinvent their role. (2022)

II. OBJECTIVE

The research aimed to fulfill the following objectives:

- To study The Pharmacy's Dual Functions

- Research Strategies Future of Pharmaceutical Practice

- The practice of pharmacy in both technology and the biological sciences.

III. METHODOLOGY

Next, we'll set the stage by talking about some fundamental concepts in research methodology. Changes in population composition, technological development, the pharmacy's institutional role, and client habits, as well as changes within the pharmacy profession, all contribute to these difficulties. In addition, it provides a review of the most important findings from studies conducted on pharmacy practice in recent years. Interprofessional and patient engagement, explaining rather than measuring therapy outcomes, and accommodating patients from a wide range of cultural backgrounds are all examples of recent developments in the field. In its last section, the paper highlights research approaches that are likely to be heavily used in the field of future research on pharmacy practice. Researchers in the field of pharmacy practice may face future methodological challenges due to the proliferation of large and complex datasets, the difficulty of interacting with electronic health records, and the use of a wide range of mixed techniques. At the very conclusion of the chapter, a conceptual model is offered as well.

IV. THE PHARMACY'S DUAL FUNCTIONS

Community Pharmacy: "Institution"
Pharmacy is the third largest health care specialty after medicine and nursing, with over 40,000 licensed chemists in England alone. Global health care systems increasingly value community pharmacy and

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pharmaceutical treatment. Community pharmacy, the most accessible form of health care in many countries, may capitalize on the burden that limited funding and personnel are putting on health care systems. English community pharmacy has several challenges. These include lower NHS funding for dispensing and other services, decreased medication reimbursement, decreased sales of non-pharmaceutical items, and an excess of pharmacies and pharmacists. Pharmacies must develop new, patient-centered roles and persuade funders to pay for these services as part of broader public health initiatives to combat epidemics of preventable disease and improve the quality of life for chronic disease patients to reverse this trend globally. (2009) Pharmacy's position in society, "where it is," and the industry's future are well-documented. Community pharmacies seem to be marginalized in health and social care nationwide and locally. The pharmacy profession is separated from other healthcare centers because it focuses on its own issues and does not actively participate in their discussions and choices. "Pharmaceutical care" and "medicines optimization" are unclear to even medical professionals. The pharmaceutical sector is debating the problem, but the public doesn't grasp the jargon, and even health policy and management experts can't agree. (2014) Customers commonly misunderstand pharmacies and pharmacists. Only 6% of British respondents had visited a chemist for chronic disease tests, although 43% said they would consider it. A 2008 consumer study revealed this. Because of this, there is a large gap between the pharmacy's claims and its capacity to provide such treatment, which raises several important questions about chemists' availability and services to patients. Lalasa (2022) Local pharmacies may have different 'positions' in respect to other groups depending on where you are. Pharmacy is growing in several countries, including the US. In several Nordic nations, where pharmacy has grown more businesslike, powerful professional groups have been eliminated and reorganized. This tendency is industry-wide. If community pharmacies are solely commercial drug dealers, will mail order, robot technology, and automated drug delivery replace them?

V. THE PRACTISE OF PHARMACY IS BEING REVOLUTIONIZED BY ADVANCES IN BOTH TECHNOLOGY AND THE BIOLOGICAL SCIENCES.

Now that we understand machine learning, we can examine its benefits to businesses.

Exponential change is reshaping pharmacy's future. AI, robots, and insights from astonishingly interoperable data are accelerating medical and technological advancements. As we go from "imprecision medicine" to precision drugs, chemists and drug distribution will alter. This combination might change pharmaceutical payments from fee-for-service to value-based, aligning them with larger payer trends. (Atkinson, 2022)

The biological sciences are innovating:
- Researchers are developing smart mirrors that evaluate your health using breath analysis and advanced cameras.
- Exoskeletons help elderly Japanese workers work longer. Many companies are experimenting basic home health care bots.
- Smartphones can now diagnose urinary tract infections4 and diabetic eye disease at home.
- 5 Labs made an edible origami robot. Ingested, this robot can cure wounds.
- Six businesses are developing a food-as-medicine technique that harnesses the stomach flora to regulate glucose and improve health. (2016)

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These advancements and health-conscious customers will change the future pharmacy. Pharmacies and chemists discuss how to adapt to the present market while preparing for the future and investing.

Pharmacists are underutilized despite their vital role in healthcare. As the pharmaceutical sector embraces enabling technologies, chemists may face a career crossroads. Raise their profile or get ignored. Bauer (2012) Algorithms will control most clinical changes, robots will deliver pharmaceuticals, and 3D-printed combination treatments will be employed. AR-enabled smart contact lenses might help pharmacy professionals do visual verification. Pharmacists may treat acute and chronic disorders including diabetes, hypertension, and asthma like primary care physicians (PCPs) in the future. Pharmacists have greater chances to advance. Global discussions on chemist prescription have demonstrated that legal adjustments are needed to fully achieve pharmacists' potential as suppliers in the US.
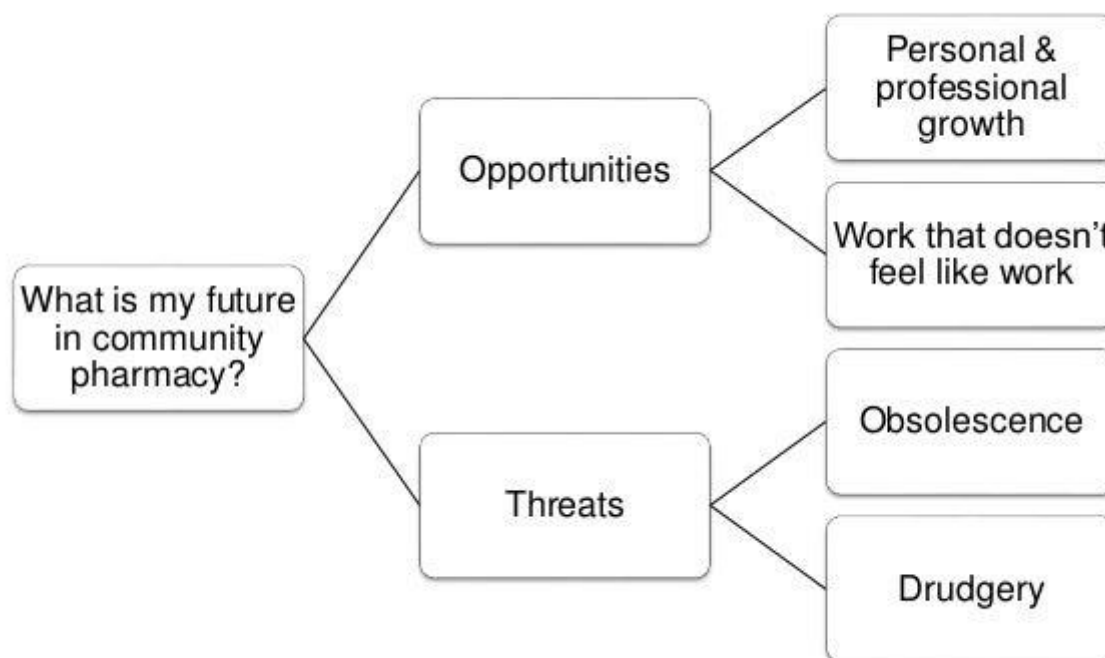

FIGURE 1. FUTURE IN COMMUNITY PHARMACY

VI. RESEARCH STRATEGIES FOR THE METHODOLOGIES OF THE FUTURE OF PHARMACEUTICAL PRACTICE

Pharmacy practice research uses a wide range of methods, as previously proven. Pharmacoepidemiology and drug utilization research (DUR) have used qualitative methods less than the study area. The patient's or user's perspective in pharmacy practice research may explain this. Due to its broad pharmacological epidemiology methodologies, this is more fluid and changing. These connected fields are becoming more amenable to different methodologies and systems. "Big data" access has also increased in several countries. This improvement is remarkable. "Big data" refers to electronic health data sets that are so large and complex that they cannot be managed using standard software, hardware, or data management tools and methods. (Flanagan, 1994) "Electronic health data sets" explains this information. Healthcare

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coined "big data". pharmacy students must now comprehend how massive data sets may be utilized to better understand patients' and users' views and evaluate pharmacist-led healthcare efforts. Sources say this section lacks citations. This phrase must be cited. This field requires a wide viewpoint and the ability to handle enormous volumes of secondary qualitative data. As approaches and impediments increase, researchers must be adaptable and receptive to hybrid methodologies. Because there are always fresh approaches and harder challenges. When working with non-academic researchers, they'll need a deeper awareness of the numerous designs and methods accessible to them. They will collaborate with these professors. If they wish to be taken seriously, pharmacy researchers must be more transparent about their identities, epistemological viewpoints, and competence in large-scale interprofessional collaborations. Research funding organizations sometimes have predetermined assumptions of what they want and how they'll judge it. This may present problems for the researcher. Although vital, they prefer to support healthcare services rather than pharmacy-specific research. Social science-trained managers monitor these programmers and make funding decisions. Thus, pharmacy practice researchers must keep up with social science methods and concepts. Future research may optimize and improve drug safety and effectiveness. If chemists actively engage in local primary care networks and have access to electronic medical records for all their patients, they can better conduct this research. Pharmacists may use connected medical data to determine local patient risk. This may also assist identify and target patients at risk of asthma or high-risk pharmaceutical complications. (Day, 1985)
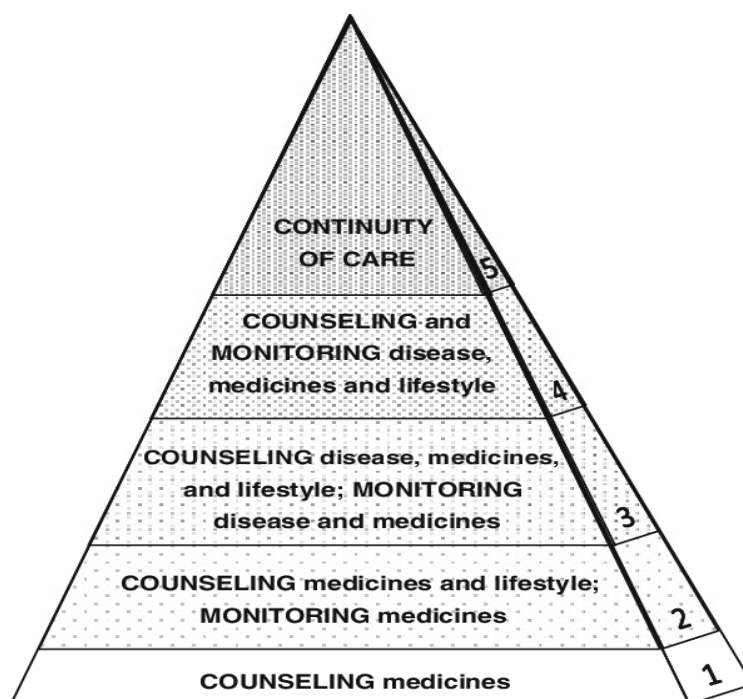

FIGURE 2: - SCOPE OF PHARMACY

CONCLUSION

This section covers the origins of the scientific study of pharmacy praxis. The key drivers of change in pharmacy practice research include demographics, technological progress, healthcare service customers, and increased research capacity as a result of technology advances. There will be new challenges in the field of pharmacy as the pharmacy industry and pharmacy practice keep pace with rapidly developing medical technologies. Future research into the field of pharmacy practices is anticipated to focus on such issues as patient-provider collaboration, outcome definition and measurement, and cultural sensitivity.

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Future methodological advances in pharmacy practice research are predicted to be driven by the development of big data and the management of massive and complex electronic health records. The more research tools scientists have at their disposal, the more challenging their tasks become. As a result, researchers will need to be comfortable combining methods from different disciplines. In addition, researchers in the area of pharmacy practice will need to keep a close watch on the most recent breakthroughs in the methodology and theories employed in the social sciences, since social scientists often lead and administer the vast majority of research efforts.

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