Social Pharmacology: A Review Of Its Implications And Trends In Covid-19 Pandemic

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ABSTRACT

Social pharmacology is the study of the behavioural relationship between medicinal drugs manufactured by pharmaceuticals and social behaviour with consumption and usage of medicine in society. It comprises of all non-pharmacological elements that significantly impact medication use after marketing. The knowledge of social surroundings is necessary for treating conditions, and clinicians must include the social aspects in all phases of biomedical education. It encourages interaction between researchers working in diverse settings, including higher education institutions, applied disciplines and the commercial sector. Societal pharmacology obtains public health information, therapeutic outcomes from patients about the effectiveness and safety of medicinal products, and execution of data obtained from the drug. The current development and marketing of coronavirus disease 2019 (COVID-19) vaccines have triggered many new societal and pharmaceutical concerns. The study of social pharmacology provides a realistic approach to drug analysis. Several solutions have been introduced to help solve pharmacological problems related to COVID-19 vaccines. In a nutshell, the field of social pharmacology covers a more comprehensive range of topics than those outlined by Phase IV of the drug development process.
INTRODUCTION:
Social pharmacology is defined as the study of the behavioural relationship between medicinal drugs manufactured by pharmaceuticals and social behaviour with particular reference to the consumption and usage of medicine in society (Figure 1).[1] It is based on multidisciplinary studies incorporating pharmacology, epidemiology, social medicine, and sociology.[1] Dr Cedric William Malcolm Wilson, a British pharmacologist, first coined the term. It was used to see the effect of psychotropic agents and drug abuse substances on the mood and behaviour of individuals in a social setting.[2] It includes drug exposure to the community and societal factors explaining the clinical & rational use of the drug.[3] In today's world, the term has broadened and incorporates contributions from many healthcare professionals, examining various aspects of medicinal drug use in the post-marketing period.[2]

Figure 1. Vital elements of Social Pharmacology

Generally, there are five key subjects (apart from clinical or rational aspects) in social pharmacological research,[4] including-
- Determinants of drug use
- Reasons for recommending, selling, consuming, or self-medicating with medicine
- Elements associated with regulatory approvals
- Social ramifications of drug usage
- Relationships between drugs, surroundings, and community

Need For Social Pharmacology
The social dynamics influenced the disease's prevalence, severity, and experience. The colonial territorial expansion, rising international trade, and the development of industrial capitalist techniques influenced sickness trends in all corners of the globe.[5] 90% of health outcomes are decided by societal and structural forces, including socioeconomic factors, education, accommodation, occupation, and everyday surroundings, whereas just 10% are determined by biomedical health services.[6]
Practitioners and educationalists must consider 1) how social inequalities, other than medical or scientific factors, influence drug use, 2) the social impacts of drug use, and 3) how various stakeholders, such as the pharmaceutical industry, regulatory agencies, sponsors, payers/public, and even non-traditional stakeholders, such as lawyers and the media, can prompt choices that affect society (as seen in COVID-19 pandemic).[7] There is an unappreciated barrier between pure biomedicine and ELSI (ethical, legal, and societal) information in most medical curricula. It causes limited access to societally and humanities-focused courses, such as bioethics, public health, health care policy, medical history, or biomedical communications, among medical students, particularly during their preclinical years of a medical study.[7] Thus the discipline of social medicine is built
on the biosocial process in which health and disease originate from the interaction of biology and the social circumstances.\textsuperscript{5}

**BIOSOCIAL APPROACH IN MEDICAL TRAINING**

The knowledge of social surroundings is necessary for treating conditions, and clinicians must include the social aspects in all phases of biomedical education—that a biosocial approach must become the basis of all medical training (Figure 2). For this, the US government has passed the 'Affordable Care Act of 2010', which includes measures that urge more involvement with the community spaces in which individuals reside, work, and learn that can play a critical component in regaining the population's health.\textsuperscript{8} Recently many organizations like SocMed, Harvard Medical School and the School of Medicine at the Lebanese American University (LAU SOM) have introduced biosocial training programs to impart awareness in social medicine.\textsuperscript{5}

\begin{figure}[h]
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\includegraphics[width=\textwidth]{figure2.png}
\caption{Elements of biosocial training.\textsuperscript{5}}
\end{figure}

**VARIABLES OF SOCIAL PHARMACOLOGY**

It comprises all non-pharmacological elements that significantly impact medication use after marketing. The person's previous mood and physical state substantially affect the drug's absorption and its effect on the individual.\textsuperscript{9} When delivered with instructions, placebo medications impact the mindset and state of the person taking medicine, significantly influence drug use, and set expectations for the future. Opinions based on previous experiences with the individual, advice from other family members or friends, or knowledge gleaned from the internet regarding drug use all impact the drug's effect. The other factors influencing the use of medication include cultural variables, rituals, social setting, attitude of the physician, expectation of the customer, content of the drug, labeling and description of medicine and its tolerance and withdrawal symptoms (Figure 3).\textsuperscript{10-12}
METHODOLOGICAL APPROACHES IN SOCIAL PHARMACOLOGY

The following established approaches are used in social pharmacology for analyzing the usage of pharmaceutical items/medicinal products/drugs and their implications on the individual and society.\textsuperscript{13}

1. Pharmacoepidemiologic studies- To determine the prescription pattern, intake, and repercussions. Studies are also conducted to assess prescription, dispensing, and follow-up quality.
2. Experimental, observational and drug utilization studies- For obtaining baseline information or actual proof.
3. Naturalistic studies- To conduct clinical evaluations, participants are observed in their natural habitat.
4. Longitudinal studies- To investigate the course and progression of the disease and the long-term effectiveness of the medications.
5. Post-marketing surveillance studies- To assess the safety and efficacy of currently marketed medications and drug abuse and misuse.
6. Pharmacoeconomic studies- To examine pharmacological therapy's societal and healthcare costs in detail.
7. Toxicity evaluation- Acute drug toxicity, toxicity in unique communities, and the practical knowledge obtained on toxicity are evaluated.
8. Pharmacogenetic studies- To understand and describe the diversity in the reaction due to ethnic differences.
9. Chrono-pharmacological studies- Depending on human biological clocks, modifying the dosage or determining the proper dosing time.
10. Studies on medication error- Categorize and analyze drug use, prescription, dispensing, and formulation faults.

ADVERSE DRUG REACTION (ADR) AND SOCIAL PHARMACOLOGY

The effect of the drug on the human body is divided into two components, mainly specific effects related to the treatment (pharmacological effect) and other
non-specific effects associated with the perception of therapy administered (non-pharmacological effect). When the non-specific effects of treatment are beneficial, they are called placebo effects, and when they are negative, they are called nocebo effects. It is caused due to complicated interactions between the patient, his overall psychosocial environment, the healthcare practitioner, and how information is provided and processed. Clinical trials examining the nocebo effect are often seen as unethical because they result in unfavorable consequences and offer no help to the patient. Patients are often distressed by these non-specific side effects, adding to their disease's stress and rising healthcare expenses. They may result in noncompliance, force clinicians to terminate potentially appropriate therapy, or encourage the use of additional medications to address the issue. As a result, clinical management of the nocebo effect is necessary, including promoting awareness, modifying the way probable drug-related adverse effects are disclosed, altering patients' expectations, and strengthening the therapeutic relationship. Healthcare professionals should tackle the ethical dilemma of limiting the nocebo reaction with adequate information and conveying techniques with the help of social pharmacological methods.

Furthermore, social media is another strategy to boost pharmacovigilance to report ADRs because many internet users explore health-related issues online. The data reported on social media require careful consideration from a regulatory and ethical standpoint. Another approach is to use 'wearable devices' that can detect geo-location, vital signs, temperature, glucose levels concentration, blood oxygen saturation, and an individual's sleeping patterns. The new technology helps report ADRs and fake medications faster and in real-time than primitive techniques. An excellent example of the use of technology is the 'WEB-RADR' project sponsored by 'Innovative Medicines Initiative' (IMI), which develops apps to report ADRs to National Competent Authorities in Europe. The growth of technology can help collect data from developing biomedical technologies and social media by establishing preventative measures and improving pharmacovigilance and patient well-being.

**PSYCHOLOGY AND SOCIAL PHARMACOLOGY**

Psychosocialpharmacology is a brand-new multidisciplinary field that combines psychology, sociology, and clinical pharmacology. It investigates non-pharmacological variables associated with the disease by considering the patient's genetics, psychological, social, and behavioral factors influencing the therapeutic efficacy. In addition, psychosocialpharmacology also investigates the impact of a doctor's attitude and voice on treatment effectiveness. It gives light on topics like the use of different drugs for mood disorders according to individual personality, the role of the doctor-patient relationship on the therapeutic outcome, preference for the benefit of western medicines over home remedies, the significance of informed content and deciphering the religious beliefs associated with mental disorders. Like social pharmacology, psychosocial factors are equally important in the clinical pharmacology sphere for treating people.

**COVID-19 AND SOCIAL PHARMACOLOGY**

The current development and marketing of coronavirus disease 2019 (COVID-19) vaccines have triggered many new societal and pharmaceutical concerns. Some of the apprehension include advantages and disadvantages of the vaccine on people's health, feeling of person on the whole pandemic scenario, individual and societal acceptance of vaccines, different viewpoints about the medication at an individual, community and demographic levels. People frequently underestimate the societal significance of herd immunity. Many people disagree with the concept of mutual benefit and herd immunity arguing that weighing benefits and dangers only makes sense collectively because the patient experiencing adverse drug reactions will not be cured by the vaccine. Moreover, many people don't consider vaccines a drug that confuses them about whether or not to take medicine if they become ill. This can be due to less awareness about the vaccination campaigns. Secondly, vaccines are administered to healthy people who have no idea that, like any other drug, it might produce adverse drug reactions. This creates fear in
a healthy population affecting the vaccine administration's acceptance or refusal rate. The third issue is that vaccines are given for preventative rather than therapeutic objectives. It is difficult for most individuals to accept adverse drug reactions from a solely preventive agent. For example, the AstraZeneca vaccine developed to fight COVID-19 infection causes venous thrombosis, which remains unknown to a large population. Considerable work needs to be done to promote vaccine acceptance among people and society. [37] However, despite their partial clinical trials, people prefer messenger RNA vaccines over AstraZeneca vaccines, depicting the power of social pharmacology. [38]

Additionally, pharmacovigilance monitoring and other drug agencies publish extensive data about the safety and efficacy of vaccines. This type of approach is desirable and necessary in the scientific world. [4] However, in the context of social pharmacology, one can worry about how individuals interpret and comprehend these findings. Health professionals also get confused about the difference between risk (probability of adverse events) and harm (adverse drug reaction) associated with the safety data. This typically causes doctors to decline the vaccine, avoid prescribing it or explore another option. [4, 39, 40] Other hurdles faced during the onset of the vaccination drive were the scarcity of vaccines, vaccine distribution across countries, disinclination of developed countries like the US and Russia to share their medications with other countries, and significant export from developing countries to Africa indicating their political motives. [4]

The study of social pharmacology provides a realistic approach to drug analysis. But society has misunderstood, ignored or overlooked the benefits of vaccination. This is because the societal pressure of fear outweighs the impact of benefits. [4] In the light of recent concerns, several solutions have been introduced to help solve pharmacological problems related to people or society. [35]

- Rebuilding vaccination trust while also increasing vaccination coverage and safety.
- Create data-collection and information-collection systems.
- Accelerate the immunization process and increase the number of vaccine options.
- Provide training to healthcare practitioners.
- Use interviewing techniques as part of an educational program to spread knowledge about the safety and importance of vaccines. [41]

These initiatives and workshops are the only way for our citizens to comprehend the medical and sociological implications of the present COVID-19 vaccination campaign, including those that will take place in the future. Social pharmacology is a crucial component of rational drug analysis (i.e., clinical pharmacology). All nations should consider and implement social pharmacology techniques with drug regulation policies for better health of individuals and society.

FUTURE PROSPECTS OF SOCIAL PHARMACOLOGY

Social pharmacology studies the combined effect of pharmaceutical and sociological studies on medication. [42, 43] It provides help in recognizing and categorizing variables that affect the pharmacodynamics and pharmacokinetics of the drug. [44] Currently, only a few countries offer an independent social pharmacology course that includes topics like drug abuse, misuse of prescriptions, and drug use in specialized populations frequently overlooked by regulatory authorities. [45] Several questions are raised in debate forums about developing research programs that add value and awareness to social pharmacology. Some of the teaching methods utilized in social pharmacology are database conversations, videos, seminars, and a trip to the pharmaceutical company where students study the manufacturing process of drugs. [7, 9, 46]

SUMMARY AND CONCLUSION

Social Pharmacology researches the pros and cons of a marketed drug for users, community, governmental authorities, and decision-makers. It explores how cultural, financial, and health policies set up a situation that increases drug abuse and provides solutions and resources to individuals and groups to minimize harmful drug use. [13] It establishes a
foundation for taking appropriate action in the global pharmaceutical business for public health.\[47\] The primary goal of social pharmacology is to highlight the actual life of the marketed drug and provide an evolutionary history of the drug in its surroundings. Regulatory agencies such as the Food and Drug Administration (FDA) and the European Medicines Agency (EMA) rarely consider these topics.\[2\] By embracing contributions from clinicians, chemists, medics, scientists, drug public health professionals, health economists, prosecutors, policymakers, financial specialists, and media specialists, this profession has broadened its scope and deepened its specialty.\[1, 13\]

Moreover, it can combine the findings of many experts in the scientific community to achieve the maximum accomplishment of health care objectives. Societal pharmacology obtains public health information, therapeutic outcomes from patients about the effectiveness and safety of medicinal products, and execution of data obtained from the drug.\[48\]

Furthermore, it encourages interaction between researchers working in diverse settings, including higher education institutions, applied disciplines and the commercial sector. In a nutshell, the field of social pharmacology covers a more comprehensive range of topics than those outlined by Phase IV of the drug development process.\[2\]

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