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SOCIAL MEDIA: PLATFORM FOR SHAPING THE FUTURE OF PHARMACOVIGILANCE

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ABSTRACT- In the past few years, the universal applicability of the internet and digital networking has led to a radical change in how people interact with each other today. Social networking phases and technologies are rapidly becoming one of the most popular forms of communication. The usage of iPads, cell phones and other electronic apps has contributed to the dramatic growth of users of social media. Advanced technologies are used in the area of pharmacovigilance to classify risks involved with the use of both new and ancient pharmaceutical products. Adverse Drug Reaction (ADR) documentation is increasingly being known not only by regulatory agencies but also by consumers of the healthcare industry and Medical professionals. Although there is a need for clarification in terms of the legislative structure and policy guidelines relating to social media data, there is no question that the use of such data will enable organizations' and regulatory bodies to achieve a deeper understanding of their industry and at the same time tracking the public health status of the population in real-time. Thus, in the coming years, social media will be a powerful medium for ADR coverage and a great forum for customers and pharma firms to share their views and feedback on the use of pharmaceutical drugs and devices.

Keywords: Social media, Adverse Drug Reaction, Pharmacovigilance, healthcare

I. INTRODUCTION

Adverse Drug Reaction (ADR) is described as any undesired result produced by a drug, which can lead to significant morbidity and mortality throughout the world (Pirmohamed *et al.*, 2004). ADR, according to the World Health Organization (WHO) is defined as "A response to a drug which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis or therapy of disease or for the modification of physiological function (World Health Organization, 1972)". The number of adverse drug reactions globally is so high that it is extremely important to control the proper use of medications.

Origin of Pharmacovigilance (PV): The word Pharmacovigilance is a hybrid word derived from one Greek word, "*Pharmakon*" which means medicinal substance and a Latin word "*Vigilia*" means to keep a watch (Fornasier *et al.*, 2018). According to WHO, PV is defined as "the science and activities relating to the detections, assessment, understanding and prevention of adverse effects or any other drug-related problem (WHO, n.d.) ".

Way back in 1950s Thalidomide was introduced as a sedative drug without causing respiratory depression. But was also used as an anti-emetic drug in treating morning sickness in pregnant women. And in the 1960s this drug caused a disaster which led to limb deformities i.e., Phocomelia (Goldman, 2001; Tripathi, 2010), an adverse event occurring in close to 10,000 babies gave a kick start for the establishment of Pharmacovigilance. Initially, a pilot project was launched with 10 countries and currently, it comprises of 134 countries as its members (WHO, n.d.).

Even though there are several of Pharmacovigilance Programs across the world (Figure 1), it was found that there is a high rate of under-reporting of the ADRs which can create a great negative impact on the public health and results into the delay of the detection ADRs (Lopez-Gonzalez, Herdeiro & Figueiras, 2009). Detection of side effects of the drug after the post-marketing approval is a difficult challenge to pharmacovigilance.

1. Vigiflow under Pharmacovigilance program of India (PVPI) (Indian Pharmacopoeia commission, n.d.); 2. FDA Adverse Event Reporting System (FAERS), VAERS database under MedWatch (Office of the Commissioner, 2020); 3. EudraVigilance (European Medicines Agency, 2018); 4. National ADR Monitoring System (Hou *et al.*, 2016)

Figure 1. Pharmacovigilance databases of major countries

Social media is a broad and emerging web-based platform that helps users to exchange their ideas, images, to share information and also interact with the other users in less time (Peck, 2014). Patients and their families are constantly using the Internet and online tools to address personal health problems, such as illnesses and medical treatment. The social life of health-related problems is strong and relies on two pillars:

a) The increased use of social media and online resources.

b) Patient encouragement to interact with other patients, particularly those dealing with chronic/life-long illnesses or conditions.

Since health-news media outlets are primarily being used by patients and their families to address health-related issues, including adverse drug effects, these channels are potentially an important source of health-related data (Langen, n.d.). Therefore, social media is a platform for finding the new side effects when the drug is released into the market through social media analysis (Sloane *et al.*, 2015).

Challenges in the field of Pharmacovigilance

- Generic drugs are becoming popular these days and they are considered safe. So, it is the utmost responsibility of the pharmaceutical industry to monitor the safety profile of the drugs even though they are considered safe (Waller *et al.*, 1992)

- Self-medication is one of the main issues because people are not informed on medications and taking medicines administered by a pharmacist without proper prescription. Advertisements from different drug companies and the easily available over-the-counter medicines with pamphlets make people take their own medical decisions (Biswas, 2008)

- For most clinical trials, adverse drug reactions that arise as a result of the research products are not reported and are not disclosed to the regulatory body due to personal involvement or fear of lawsuits. Thus, Clinical trials also represent a significant threat to the pharmacovigilance system.

- Web-based information on non-authentic medicines and illnesses has provided a significant threat to the pharmacovigilance programme. This leads to the unregulated selling of pharmaceutical

drugs with medication knowledge of varying degrees, of uncertain health, effectiveness and consistency (Jeetu & Anusha, 2010).

- Lack of continuous patient education on pharmacovigilance and lack of knowledge on medications has contributed to the under-reporting of adverse drug effects. Much of the time, physicians feel that they need to record only if the adverse effects have a causal connection with the goods.

- Diseases such as hepatitis, HIV/AIDS, etc. and in vital cases need several medications. The adverse effects that arise as a result of reactions with specific medications often present a challenge in the detection of offending medicines that can cause significant potential health risks if the offending agents are not withdrawn. In this case, due care in evaluating the pharmacokinetic effects of current medication treatments and regimens should be assessed on a routine basis (Kane-Gill *et al.*, 2012).

II. SOCIAL MEDIA IN HEALTHCARE

Billions of people around the world have grown up in the age of social media, and humankind is slowly moving towards a future where almost everyone will be a digital citizen.

The concept of "social media" is broad and is constantly changing. The term generally refers to "Internet-based tools that allow individuals and communities to gather and communicate; to share information, ideas, personal messages, images, and other content; and, in some cases, to collaborate with other users in real-time (Peck, 2014)", Figure 2. Represents various social media applications used in this Universe.

Figure 2. Major social media platforms used on this Universe

Social media and healthcare are very strong combination. Social networks have been an essential health tool, not just for millennials. Almost 90% of older adults used social media to browse for and exchange health information (Newberry, 2020).

Health 2.0 is a term which is defined as "the use of web 2.0 or social media in healthcare (Anon, n.d.)".

Facebook, Twitter, Instagram, YouTube, Blogs are the tools used to facilitate cooperation among patients and their families, medical professionals and other healthcare partners to achieve better healthcare results. According to the survey from the Phew Research Centre (Figure 3), it was found that 68% of the users consider Facebook as the most powerful social media site whereas 35% of the users spend on an average of 24 minutes a day on Instagram. YouTube is the second most popular search engine in the world (Smith, n.d.), 73% of the YouTube viewers used this platform to solve their problems related to work, health, etc. In addition to that 23% of the users prefer Twitter whereas LinkedIn is a platform used as a source of content by 25% of the users (Spisak, n.d.).

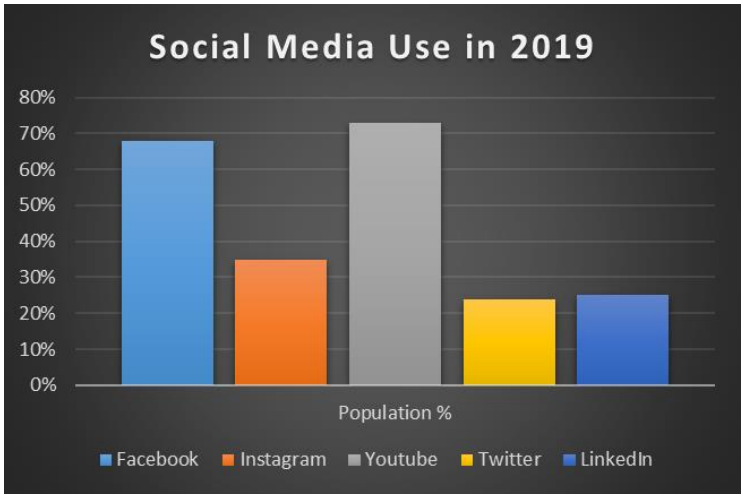

Figure 3. Use of Social Media in 2019

Role of Social Media in Pharmacovigilance

Patients tend to share their experiences with those trying to cope with similar problems/results that make these social networks different and offer a source of knowledge on health, drugs and treatment. Due to the introduction of such platforms and the abundance of statistics available through them, the monitoring of public health, together with the monitoring of the ADRs, has focused on the exploitation of information from these sources in recent times. (Kass-Hout & Alhinnawi, 2013).

Patients usually share their experiences rather than sharing in a clinical research study or with their doctors (Davison, Pennebaker & Dickerson, 2000). One research, led by Knezevic et al in 2011, explains how the Facebook community was developed as an Adverse Event (AE) channel and its effectiveness monitored. The group found that it had been able to communicate with 1,000 Facebook users and had received 21 adverse reactions within seven months (Knezevic *et al.*, 2011).

The importance of social media in pharmacovigilance will inevitably be determined by the relative importance it adds to the detection of new safety problems or new aspects of current safety concerns. When thinking about the function of any data in pharmacovigilance, such as social media, it can be useful to generally identify in various fields, as seen by the possible use of social media and its applicability in each field in the Figure 4.

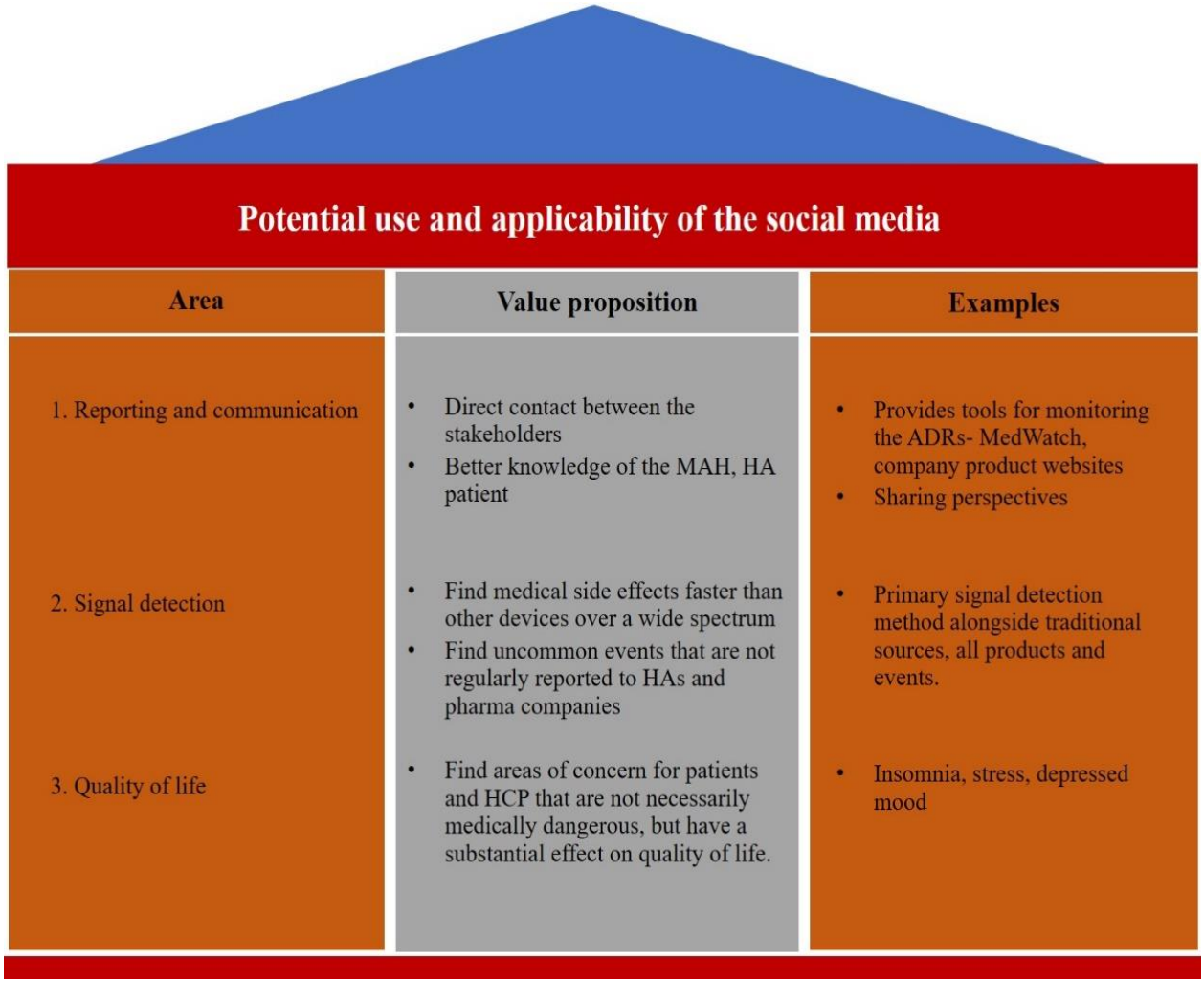

Figure 4: Potential use and applicability of the social media (van Stekelenborg *et al.*, 2019)

When different patients who have a chronic illness or have a habit to use a particular medication, share the experience of their conditions, medications or drug effects, this knowledge may offer useful clinical data for both patients and healthcare industries that go beyond conventional communication strategies (Sarasohn-Kahn, 2008). Infectious/viral disease control, in particular, may benefit greatly from the use of social media. Often the standard method may ignore recent or unexpected events (such as a new outbreak of the virus) and lack real-time resources, here social media play an important role in providing the data from the individual who may not get entry through the formal channels (Velasco *et al.*, 2014). Besides, several of social media monitoring systems have been developed, validated and introduced locally, nationwide and internationally over the last decade (Hartley, 2014).

User updates in social media offer patient experience evidence and early access to captured ADRs that could be of interest to the health and pharmaceutical industries. The type and volume of ADR information that social media allow access to the health sector may not be readily available by any means. It involves ADRs reported by those with specific circumstances, such as patients with genetic illnesses, elderly people or patients with comorbidities usually excluded from clinical trials (Stricker & Psaty, 2004).

III. ROLE OF SOCIAL MEDIA IN HOSPITALS

The past decades were built upon the third industrial revolution and its preceding revolutions. Now in the 21st century, it is time for the fourth industrial revolution (Njuguna, n.d.). It will be an augmentation of third industrial revolution i.e. digitalization with biological and physical worlds (Klaus, 2016). According to the world economic forum, the fourth industrial revolution will be effecting every industry in every country (Njuguna, n.d.). The Smartphone is the human's best buddy of the current generation (W B, 2017). Social media being an integral part of everyone's life it is used in status updates, messaging, and live

conversation which is powered by emoji's an attractive graphical interfaces (Nick, n.d.). It is being utilized in every sector and it is no more an option for healthcare organizations. Approximately 99% of US-based hospitals are active on Facebook by owning a page and engaging their patients (Evariant, 2019).

The following are the examples of where social media can play a potential role in hospital

1. Customer Service: Customer service is a key department for the success of any organization. Social media can be used to answer the questions of public for instance, Hospital timings, Doctor's availability and facility departments available in the hospital, etc. In this era of the digital world, though there are chatbots for customer service, it doesn't give the natural presence of a person solving the patient's queries. Social media can serve as a seamless and accurate medium for customer service (Meskó, 2013; Christopher, n.d.)

2. Patient education: Education about health and disease is important for the wellbeing of society. Social media could play an important role in educating patients. Hospitals and other healthcare agencies like WHO, Red Cross and Centers for Disease control can spread awareness about disease, especially in pandemic situations by using social media. E.g. Plaque, Spanish-flu, Tuberculosis, COVID-19 (Meskó, 2013)

3. Public relations: In this current era, every organization tries to make its presence in society. Social media is one of the potential tools to make organization's online presence by posting information regarding its milestones achieved, research results, updates on new branches opened and current events going on.

Adoption curve of social media

"Those who cannot change their minds cannot change anything", as said by George Bernard Shaw, the society and hospitals need to adopt social media in their practices.

The various steps involved in the implementation of social media begins from identifying the different online platforms which are involved in communication (Facebook, Twitter, Instagram, YouTube etc.), identifying target audience who need personalized content, creating awareness by sending messages and making announcements, contributing in online discussion forums, developing a relationship with the audience and finally collaborate with patients.

Mayo Clinic is an ideal organization that embraced this change of implementing social media in the health sector. It showcased its presence by creating accounts on YouTube, Facebook, Twitter and also writing content in blogs of its website. It also created annex of its website, Mayo Clinic Center for Social Media and patient community known as "Connect" which provides an option to share their views on services offered, watch various videos regarding diseases and connect the network of patients for a purpose (Meskó, 2013)

Strategy for implementation of Social media in Medical Practice

Social media is like a coin with two faces. If utilized wisely it is the potential tool for success or it may be vice-versa. Figure 5 gives a brief idea of an implementation strategy (Meskó, 2013)

Figure 5. Strategy for implementation of Social media

IV. CONCLUSION

The need for pharmacovigilance is becoming important day by day, as the amount of adverse effects identified with the drugs is growing and because of this ADRs underreporting is a widespread issue. It will be important to discuss more and more ways and resources to harness the influence of social media on pharmacovigilance practices. Although there is a need for clarification in terms of the legislative structure and policy guidelines relating to social media data, there is no question that the use of such data will enable organizations' and regulatory bodies to achieve a deeper understanding of their industry and at the same time tracking the public health status of the population in real-time. Thus, in the coming years, social media will be a powerful medium for ADR coverage and a great forum for customers and pharma firms to share their views and feedback on the use of pharmaceutical drugs and devices.

REFERENCES

1. Anon (n.d.) *Social media in healthcare*. [Online]. Available from: https://innovatemedtec.com/digital-health/health-social-media-in-healthcare [Accessed: 10 April 2020].
2. Biswas, P. (2008) Pharmacovigilance: Safety matter. *Indian journal of pharmacology*. 40 (Suppl 1), S1–S2.
3. Christopher, E. (n.d.) *Chatbots Are Killing Customer Service. Here's Why*. [Online]. Available from: Chatbots Are Killing Customer Service. Here's Why.
4. Davison, K.P., Pennebaker, J.W. & Dickerson, S.S. (2000) Who talks? The social psychology of illness support groups. *American Psychologist*. 55 (2), 205.
5. European Medicines Agency (2018) *EudraVigilance*. [Online]. 17 September 2018. Available from: https://www.ema.europa.eu/en/human-regulatory/research-development/pharmacovigilance/eudravigilance [Accessed: 8 April 2020].
6. Evariant (2019) *The Role of Social Media in Healthcare: Benefits & Challenges*. [Online]. 2019. Available from: https://www.evariant.com/blog/the-evolving-role-of-social-media-in-healthcare [Accessed: 17 March 2020].
7. Fornasier, G., Francescon, S., Leone, R. & Baldo, P. (2018) An historical overview over Pharmacovigilance. *International Journal of Clinical Pharmacy*. [Online] 40 (4), 744–747. Available from: doi:10.1007/s11096-018-0657-1.
8. Goldman, D.A. (2001) *Thalidomide Use: Past History and Current Implications for Practice*. 28 (3), 7.
9. Hartley, D.M. (2014) Using social media and internet data for public health surveillance: the importance of talking. *The Milbank Quarterly*. 92 (1), 34.
10. Hou, Y., Li, X., Wu, G. & Ye, X. (2016) National ADR Monitoring System in China. *Drug Safety*. [Online] 39 (11), 1043–1051. Available from: doi:10.1007/s40264-016-0446-5.
11. Indian Pharmacopoeia commission (n.d.) *Pharmacovigilance Programme of India*. [Online]. Available from: http://www.ipc.gov.in/PvPI/pv_home.html [Accessed: 8 April 2020].
12. Jeetu, G. & Anusha, G. (2010) Pharmacovigilance: a worldwide master key for drug safety monitoring. *Journal of young pharmacists : JYP*. [Online] 2 (3), 315–320. Available from: doi:10.4103/0975-1483.66802.
13. Kane-Gill, S.L., Kirisci, L., Verrico, M.M. & Rothschild, J.M. (2012) Analysis of risk factors for adverse drug events in critically ill patients*. *Critical care medicine*. [Online] 40 (3), 823–828. Available from: doi:10.1097/CCM.0b013e318236f473.
14. Kass-Hout, T.A. & Alhinnawi, H. (2013) Social media in public health. *British medical bulletin*. [Online] 108, 5–24. Available from: doi:10.1093/bmb/ldt028.
15. Klaus, S. (2016) *The Fourth Industrial Revolution: what it means, how to respond*. [Online]. 14 January 2016. Available from: https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/ [Accessed: 14 March 2020].
16. Knezevic, M.Z., Bivolarevic, I.C., Peric, T.S. & Jankovic, S.M. (2011) Using Facebook to increase spontaneous reporting of adverse drug reactions. *Drug safety*. 34 (4), 351–352.
17. Langen, J. (n.d.) *Social Media Screening for ADR-monitoring – Like it or not!* [Online]. Available from: https://pharma.elsevier.com/pharmacovigilance/social-media-screening-for-adr-monitoring-like-it-or-not/?fsdsd=efwe [Accessed: 12 April 2020].
18. Lopez-Gonzalez, E., Herdeiro, M.T. & Figueiras, A. (2009) Determinants of under-reporting of adverse drug reactions. *Drug safety*. 32 (1), 19–31.
19. Meskó, B. (2013) *Social Media in Clinical Practice*. [Online]. London, Springer London. Available from: doi:10.1007/978-1-4471-4306-2 [Accessed: 29 March 2020].
20. Newberry, C. (2020) *How to Use Social Media in Healthcare: A Guide for Health Professionals*. [Online]. 2020. Available from: https://blog.hootsuite.com/social-media-health-care/ [Accessed: 10 April 2020].

21. Nick, R. (n.d.) *The social media universe in 2018*. [Online]. Available from: https://www.weforum.org/agenda/2018/08/visualizing-the-social-media-universe-in-2018 [Accessed: 15 March 2020].

22. Njuguna, N. (n.d.) *The Fourth Industrial Revolution and digitization will transform Africa into a global powerhouse*. [Online]. Available from: https://www.brookings.edu/research/the-fourth-industrial-revolution-and-digitization-will-transform-africa-into-a-global-powerhouse/ [Accessed: 16 March 2020].

23. Office of the Commissioner (2020) *MedWatch: The FDA Safety Information and Adverse Event Reporting Program*. [Online]. 27 January 2020. FDA. Available from: https://www.fda.gov/safety/medwatch-fda-safety-information-and-adverse-event-reporting-program [Accessed: 8 April 2020].

24. Peck, J.L. (2014) Social media in nursing education: responsible integration for meaningful use. *Journal of Nursing Education*. 53 (3), 164–169.

25. Pirmohamed, M., James, S., Meakin, S., Green, C., et al. (2004) Adverse drug reactions as cause of admission to hospital: prospective analysis of 18 820 patients. *BMJ*. [Online] 329 (7456), 15–19. Available from: doi:10.1136/bmj.329.7456.15.

26. Sarasohn-Kahn, J. (2008) *The wisdom of patients: Health care meets online social media*.

27. Sloane, R., Osanlou, O., Lewis, D., Bollegala, D., et al. (2015) Social media and pharmacovigilance: a review of the opportunities and challenges. *British journal of clinical pharmacology*. 80 (4), 910–920.

28. Smith, K. (n.d.) *57 Fascinating and Incredible YouTube Statistics | Brandwatch*. [Online]. Available from: https://www.brandwatch.com/blog/youtube-stats/ [Accessed: 10 April 2020].

29. Spisak, K. (n.d.) *2019 Social Media Trends & Statistics - Business 2 Community*. [Online]. Available from: https://www.business2community.com/social-media/2019-social-media-trends-statistics-02156179 [Accessed: 10 April 2020].

30. van Stekelenborg, J., Ellenius, J., Maskell, S., Bergvall, T., et al. (2019) Recommendations for the Use of Social Media in Pharmacovigilance: Lessons from IMI WEB-RADR. *Drug Safety*. 42 (12), 1393–1407.

31. Stricker, B.Hc. & Psaty, B.M. (2004) Detection, verification, and quantification of adverse drug reactions. *Bmj*. 329 (7456), 44–47.

32. Tripathi, K.D. (2010) *Essentials of medical Pharmacology*. 6th edition. New Delhi, Jaypee Brothers.

33. Velasco, E., Agheneza, T., Denecke, K., Kirchner, G., et al. (2014) Social media and internet-based data in global systems for public health surveillance: a systematic review. *The Milbank Quarterly*. 92 (1), 7–33.

34. W, B. (2017) *Smartphones: Man's New Best Friend?* [Online]. 2017. Available from: https://vocal.media/humans/smartphones-mans-new-best-friend [Accessed: 15 March 2020].

35. Waller, P.C., Wood, S.M., Langman, M.J., Breckenridge, A.M., et al. (1992) Review of company postmarketing surveillance studies. *BMJ (Clinical research ed.)*. [Online] 304 (6840), 1470–1472. Available from: doi:10.1136/bmj.304.6840.1470.

36. WHO (n.d.) *WHO | Fast facts on Pharmacovigilance*. [Online]. Available from: http://www.who.int/medicines/areas/quality_safety/safety_efficacy/PV_fast_facts/en/ [Accessed: 8 April 2020].

37. World Health Organization (1972) *International drug monitoring: the role of national centres, report of a WHO meeting [held in Geneva from 20 to 25 September 1971]*. World Health Organization.