Pharmaceutical Industry Regulatory Audits in D-8 Countries: Retrospective Analysis.

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Abstract:

The pharmaceutical industry is an important sector that contributes significantly to the healthcare system in D-8 countries. Regulatory agencies play a critical role in ensuring that pharmaceutical products are safe, effective, and of high quality. To achieve this, regulatory agencies conduct regular audits of pharmaceutical facilities to assess their compliance with Good Manufacturing Practices (GMP) and other relevant regulations and standards. This study aimed to analyze the regulatory audits encountered by pharmaceutical industries in D-8 countries between 2018 and 2022. The study also revealed that regulatory agencies in D-8 countries face various challenges that affect the effectiveness of regulatory audits. These challenges include inadequate resources, limited technical expertise, and regulatory barriers. For instance, regulatory agencies may have limited funding, staff, and equipment to conduct effective audits. They may also have limited expertise to understand complex manufacturing processes and technologies. In conclusion, this study provides valuable insights into the regulatory landscape of D-8 countries and can guide pharmaceutical industries and regulatory agencies in developing effective strategies to improve compliance and ensurequality, safety, and efficacy of regulated pharmaceutical substances. It is important for regulatory agencies to address the challenges they face and to work collaboratively with the pharmaceutical industry to achieve their shared goals of ensuring public health and safety.

Keywords: Audits, GMP, Inspection, DGDA, BPOM.

Introduction

Pharmaceutical business regulatory audits are essential. Pharmaceutical firms may be certain that their goods are safe, effective, and of excellent quality because of these inspections [1]. Independent auditors or government bodies undertake regulatory audits in the pharmaceutical business to ensure conformity with rules and norms[2]

The pharmaceutical industry's regulatory audits focus on the following major areas:

Consistent production and management of pharmaceutical goods that satisfy quality requirements is ensured by adherence to Good Manufacturing Practices (GMPs), a set of criteria developed by regulatory organizations [3]. GMP compliance, which encompasses quality control, product testing, and documentation, is often the subject of regulatory audits [4].

1. *Documentation:*Documentation of a pharmaceutical company's adherence to the many rules and regulations by which it must abide may be rather lengthy. Record-keeping, document retention, and data accuracy might all be examined in depth during regulatory audits [5].
2. *Quality control and assurance:*Quality control and assurance processes are often audited during a regulatory inspection of a pharmaceutical firm. These programs include things like product testing and release, complaint and adverse event investigation, and product safety and effectiveness [6].
3. *Regulatory compliance:*The pharmaceutical industry is subject to a wide variety of rules and standards from organizations like the FDA, the EMA, and others. Finished product labelling, advertising, and promotion activities are just some of the areas that may be scrutinized in regulatory audits [7].
4. *Facility and equipment compliance:*A pharmaceutical firm's infrastructure, including its factories, warehouses, and labs, may be subject to inspection as part of a regulatory audit. Auditors might check to see whether infrastructure is maintained to standards laid down by authorities [8].

The pharmaceutical sector undergoes several forms of regulatory audits. Some of the most typical examples are as follows:

1. *GMP Audits to Ensure Compliance:* Good Manufacturing Practices (GMPs) are what these audits check for in a pharmaceutical firm. Quality pharmaceuticals are continuously manufactured and monitored in accordance with Good Manufacturing Practices (GMPs) [9]. Product testing, release, complaint and adverse event investigation, and other quality control and assurance processes are all evaluated in these types of audits.
2. *Audits Prior to Approval: Before the approval of a new drug or medical device, these audits are conducted* [10]. These audits are conducted by regulatory agencies to assess a company's ability to manufacture and test products in accordance with regulatory requirements.
3. *Audits performed following approval:*These investigations are conducted after marketing approval has been granted for a substance or medical device. These audits are conducted by regulatory agencies to assess a company's continued compliance with regulatory requirements and guidelines [11].
4. *Conformity Audits:* The purpose of these inspections is to ensure that a business is following all applicable laws and norms. [12]. A business may be subject to an audit to ensure that it is following the rules for labeling, adverse event reporting, and promotional materials.
5. *Suppliers Audits:*Supplier and contractor compliance with laws and corporate policies are checked in these sorts of audits. [13]. Supplier quality control plans, production facilities, and record-keeping procedures may all be subject to scrutiny during such audits.
6. *Internal Audits:*Internal auditors at pharmaceutical firms do these checks to ensure the business is following all rules and regulations. Internal audits are a preventative method of spotting and fixing any compliance problems before a regulatory body does [14].

In the grand scheme of things, regulatory audits are very important for making sure pharmaceuticals are safe, effective, and of high quality. RA (Regulatory audits) strengthen public trust in the pharmaceutical sector by ensuring it operates in accordance with applicable laws and rules designed to safeguard consumers.

The D8 Nations:

"D8" stands for the emerging-8, or D-8, a group of emerging nations with a common goal of fostering sustained economic expansion. On June 15, 1997, in Istanbul, Turkey, the D8

nations were officially established with the signing of the Istanbul Declaration. These are the D8 nations:

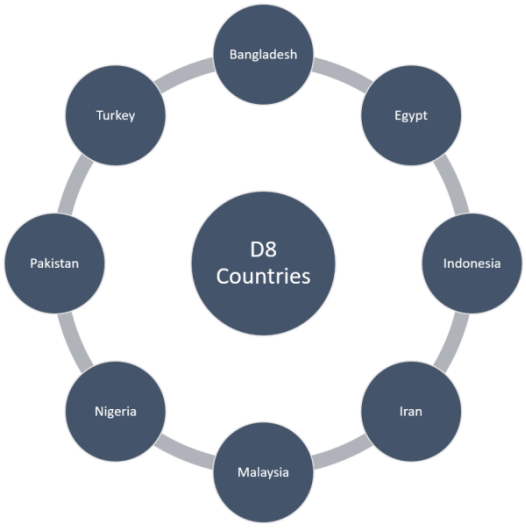

Fig.No1: The D8 Nations

There is a wide variety of geography, religion, and culture represented in these nations. There are more than a billion people living in the D8 nations, and their economies are expanding rapidly. The D8 nations want to boost their economic growth and prosperity by working together on a variety of economic and development concerns. Trade, investment, manufacturing, agriculture, and technology are just some of the sectors where the two countries might work together. To further enhance their links and develop mutual understanding, the D8 nations are also working to expand cultural and social collaboration and people-to-people interaction.

Organization for Regulating Markets in the D8

Each of the D8 nations has its own independent regulatory body that controls and monitors domestic businesses. Some representative regulatory bodies from the D8 countries are listed below.

1. Bangladesh: Directorate General of Drug Administration (DGDA)
2. Egypt: Egyptian Drug Authority
3. Indonesia: National Agency of Drug and Food Control (BPOM)
4. Iran: Food and Drug Administration of Iran
5. Malaysia: National Pharmaceutical Regulatory Agency (NPRA),
6. Nigeria: National Agency for Food and Drug Administration and Control (NAFDAC)
7. Pakistan: Drug Regulatory Authority of Pakistan (DRAP)

8. Turkey: Turkish Medicines and Medical Devices Agency (TITCK).

The enforcement of industry-specific rules and recommendations falls within the purview of these regulatory bodies. They monitor businesses for compliance with the law and prosecute those that break the rules to keep people safe and the environment pristine. To further regulatory harmonization and the exchange of best practices, each regulatory agency also works with its peers in the D8 and beyond.

Methods of Inspection:

- *Inspecting and giving advance notice:*The DGDA will inform the pharmaceutical business of the date and time of the inspection.
- *Examining Paperwork Before an Inspection:*Prior to an inspection, DGDA officials study the pharmaceutical company's records pertaining to the production, quality assurance, and testing of pharmaceutical products.
- *Site-Specific Inspecting:*The production plant, laboratories, and storage rooms of the pharmaceutical firm are subjected to a comprehensive examination by DGDA officials. Good Manufacturing Practices (GMP) and other regulatory standards are assessed by the inspectors.
- *To test and sample:*During an inspection, DGDA officials may take samples of both completed goods and raw materials to test in the lab to guarantee they are up to code.
- *Report after inspection:*Inspectors from the DGDA compile a report detailing their inspection results and discoveries after the fact. The study contains suggestions for changes and enhancements that might be implemented to better meet regulatory standards.
- *Checkups in the future:* To make sure the pharmaceutical business has adopted the suggested changes, the DGDA may perform follow-up inspections.

Methodology: The pharmaceutical industries of the D-8 nations have been analyzed using a retrospective study methodology and comparative analysis to determine their level of dedication to the adoption of quality systems.Data was gathered from regulatory audit reports, inspection reports, warning letters, and other pertinent documents found on the publicly accessible websites of regulatory authorities in the D8 countries. Strategies of D8 Counties towards the inspection of Pharmaceutical Manufacturing sites

Results and Discussion:

Table No.1: The Quantity of D8 Country Inspections of Production Facilities

S.No	Country	Regulatory Authority	2018	2019	2020	2021	2022
1.	Bangladesh	Directorate General of Drug Administration (DGDA)	20	0	0	0	0
2.	Egypt	Egyptian Drug Authority (EDA)	NP	NP	NP	NP	NP
3.	Indonesia	National Agency of Drug and Food Control (NADFC)	132	144	121	129	NP
4.	Iran	Food and Drug Administration (FDA) of Iran	NP	NP	NP	NP	NP
5.	Malaysia	National Pharmaceutical Regulatory Agency (NPRA)	192	179	183	369	NA
6.	Nigeria	National Agency for Food and Drug Administration and Control (NAFDAC)	8	36	34	104	3
7.	Pakistan	Drug Regulatory Authority of Pakistan (DRAP)	NP	NP	NP	NP	NP
8.	Turkey	Turkish Medicines and Medical Devices Agency (TITCK)	NP	NP	NP	NP	NP

*****NP= Not Published

From the above statistics number of inspection on Pharmaceutical Manufacturers located on D8 countries were found that Malaysia regulatory agency National Pharmaceutical Regulatory Agency (NAFDAC) and Indonesia Regulatory Agency National Agency of Drug and Food Controlwererecorded more number of inspections and published it in their official websites. Concern for the other D8 countries has also been expressed by Nigeria's regulatory body, the National body for Food and Drug Administration and Control.

Table No.2: Analyzing the Inspection Process Across the D8 Countries

S.No	The D8 Countries and Their Approach to Regulation	Approaches to Inspecting in the D8 Countries
1.	Bangladesh: The Directorate General of Drug Administration (DGDA) is	Pharmaceutical manufacturing, quality assurance, and testing facilities are all subject to the DGDA's requirements. A group of inspectors with the appropriate technical expertise and training conducts the inspections

	responsible for overseeing the pharmaceutical business in Bangladesh.	[15].
2.	Egypt: The Central Administration for Pharmaceutical Affairs (CAPA) administers the pharmaceutical industry in Egypt.	GMP and GLP inspections are performed by the CAPA. A group of licensed, knowledgeable inspectors performs each and every one of these checks [16].
3.	Indonesia: The National Agency for Drug and Food Control (BPOM) oversees the pharmaceutical sector in Indonesia.	The BPOM checks pharmaceutical factories for GMP conformity via inspections. The examinations are carried out by a group of specialists with relevant experience and education [17].
4.	Iran : The Food and Drug Organization(FDO) oversees the pharmaceutical business in Iran.	Iran's Food and Drug Organization (FDO) is responsible for overseeing the country's pharmaceutical sector [18]
5.	Malaysia: The National Pharmaceutical Regulatory Agency (NPRA) oversees the Malaysian pharmaceutical sector.	NPRA inspection policy aims to ensure that all regulated products in Malaysia are of high quality, safe, and effective. The policy outlines the inspection process, including pre- and post-inspection activities, and provides guidance on the conduct of inspections, documentation requirements, and post-inspection procedures.
6.	Nigeria: NAFDAC is the Nigerian government agency in charge of overseeing the country's pharmaceutical sector.	The policy emphasizes the importance of compliance with GMP requirements and other relevant regulations and standards, and outlines the potential consequences of non-compliance, including regulatory action, such as suspension or revocation of licenses, import/export restrictions, or legal action.
7.	Pakistan: The Drug Regulatory Authority of Pakistan (DRAP) regulates the pharmaceutical industry	The DRAP performs inspections to check for GMP compliance. The inspections are performed by experts in the subject who work in teams.

	in Pakistan.	
8.	Turkey: Turkey's pharmaceutical sector is overseen by TTCK, the Turkish Medicines and Medical Devices Agency.	TITCK inspection principles reflect the agency's commitment to safeguarding public health and ensuring that regulated products in Turkey meet high quality, safety, and efficacy standards

Conclusion:

Analysis of regulatory audits faced by the pharmaceutical businesses in the D-8 countries shows how important it is to follow regulations to make sure that pharmaceutical goods are safe, effective, and of good quality. Good Manufacturing Practice (GMP) standards must be met, so each D-8 country has set up governing groups and testing processes. The goal of the governmental checks is to find any differences from the set standards and make sure that the right steps are done to fix any problems.Even though different countries may have different rules and processes, the general goal is to protect public health by making sure that medicinal goods are safe and efficient. It is clear that some of the D8 countries were not set up with the right inspection standards, and inspection results are not clear.The research also shows how important it is for governing systems, review processes, and industry practices to keep getting better and more in line with changing global standards and best practices. In this way, the pharmaceutical businesses in D-8 countries can build trust with partners around the world, improve their access to foreign markets, and help the economy grow in a healthy way.

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