Pharmacovigilance: Ensuring Drug Safety

Pharmacovigilance (PV):

- Is the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other medicine/ vaccine related problem.
- Identifying new information about hazards associated with medicines.
- Preventing harm to the patients.
- Pharmacovigilance programs made strong by links with regulators.
- The PV effort in the India is coordinated by the Indian Pharmacopoeia Commission (IPC) and conducted by the Central Drug standard Control Organization (CDSCO).
- Pharmacovigilance continues throughout the product life cycle of the drug. When a drug is administered or launched into the market, there exist a lot of safety problems. These problems can be easily detected by Pharmacovigilance studies. Pharmacovigilance is of core importance to identify, check and quantify the risk factors which usually occur when the drug is administered.

Essential Methods in Pharmacovigilance for Ensuring Drug Safety:

1) **Causality assessment:**
    i) Relationship between a drug and suspected adverse reaction is measured.
    ii) Evaluate benefit- risk profiles of drug.
    iii) Types of causality assessment scales:
        a) WHO-UMC Causality assessment scale
        b) Naranjo Scale
        c) Hartwig scale

2) **Periodic safety update reports:**
   i) Comprehensive documents prepared by pharmaceutical companies at regular intervals, for regulatory submission.
   ii) Report all the relevant new safety information.
   iii) Relate these data to patient exposure.
   iv) Summarize the market authorization status in different countries and any significant variation related to safety.

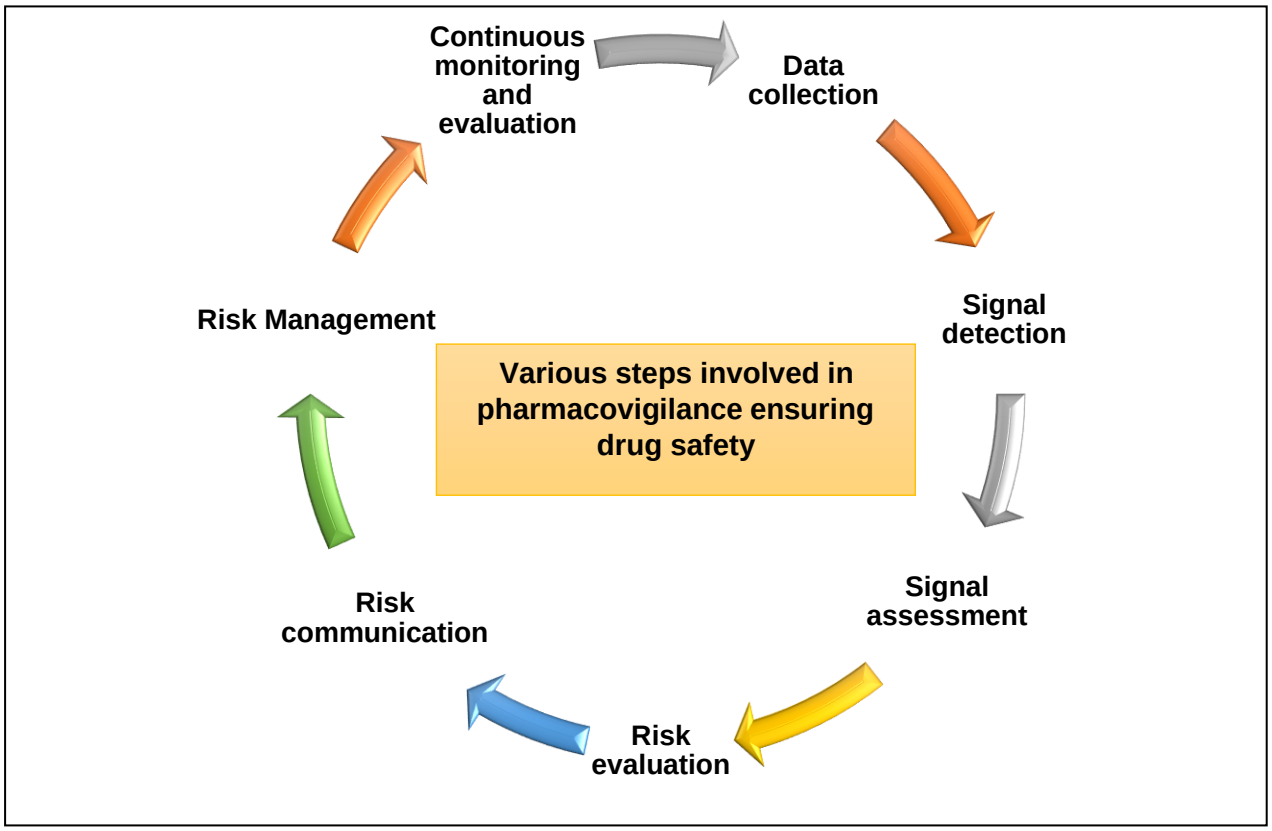
3) **Spontaneous reporting system:**
   i) The process of reporting of all unsolicited reports of adverse events from health care FDA
   ii) Process: Data acquisition, Data assessment, Data interpretation

4) **Risk minimization and management:**
   i) Implemented to mitigate the occurrence and impact of ADR.
   ii) These strategies may include changes to product labelling, implementation of risk communication plans, post marketing studies or withdrawal of the drug from market if the risks outweigh the benefits.

5) **Post Marketing Surveillance studied:**
   i) Is the identification and collection of information regarding medication after their regulatory approval.
   ii) Systematic monitoring of medications as they are used in real life scenarios.
   iii) Provide valuable information on the use of drugs in special patient population.

6) **Pharmacovigilance program of India (PvPI):**
   i) Create a nation-wide system for patient safety by ensuring drug safety
   ii) Identify and analyse new signals from the reported cases.
   iii) Analyse the benefit-risk ratio of marketed medications.
   iv) Generate evidence-based information on safety of medicines.
   v) Support regulatory agencies in the decision-making process on use of medications.
   vi) Communicate safety information on use of medicines to various stakeholders for preventing/minimizing the risk.
   vii) Promote rational use of medicines.

Ensuring Drug Safety: Key Steps in Pharmacovigilance:



(https://health.ec.europa.eu/medicinal-products/pharmacovigilance_en)

1. **Data collection:** Pharmacovigilance begins with the systematic collection of information regarding ADRs from various sources. Such as healthcare professionals, patients, literature, clinical trials and regulatory agencies. Data collection methods may involve spontaneous reporting systems, electronic health records, etc.

2. **Signal detection:** Identifying potential safety concerns or new information about known adverse effects associated with a drug. Statistical algorithms, data mining techniques, and qualitative assessments are used to detect signals from the collected data. Detected signals serve as early warnings for potential safety issues that require further investigation.

3. **Signal assessment:** Detected signals undergo thorough assessment to determine the strength and validity of the association between the drug and the adverse event. Causality assessment tools, such as the WHO-UMC causality categories or the Naranjo algorithm, are often used to evaluate the likelihood of the drug

causing the adverse reaction. Assessment helps prioritize signals for further investigation and action.

4. **Risk evaluation:** Risk evaluation involves assessing the potential risks associated with the use of the drug in relation to its intended therapeutic benefits. Factors such as the severity and frequency of adverse events, patient population characteristics, and available treatment alternatives are considered. Evaluation helps healthcare professionals and regulatory authorities make informed decisions regarding the safe use of the drug.

5. **Risk communication:** Effective communication of drug safety information is crucial for informing healthcare professionals, patients, and regulatory authorities about potential risks associated with the use of the drug. This step involves disseminating safety alerts, updating product labelling and packaging, and providing educational materials to healthcare providers and patients. Transparent and timely communication fosters trust and ensures that stakeholders are aware of the latest safety information.

6. **Risk Management:** Risk management strategies aim to minimize or mitigate identified risks while maximizing the benefits of the drug. Strategies may include changes to product labelling, implementation of risk minimization measures (e.g., restricted distribution programs), post-marketing studies, and regulatory actions. Continuous monitoring and adaptation of risk management strategies are essential to address emerging safety concerns throughout the lifecycle of the drug.

7. **Continuous monitoring and evaluation:** Continuous monitoring and evaluation are essential processes in pharmacovigilance, ensuring the ongoing safety of medicinal products. Continuous monitoring involves the systematic surveillance and collection of safety data from various sources, while continuous evaluation entails the systematic assessment of the benefit-risk profile of a drug based on the latest available data. These processes enable the timely detection of safety signals, prompt risk assessment, and implementation of appropriate risk management measures to protect patient health. By incorporating continuous monitoring and evaluation into pharmacovigilance practices, stakeholders can

proactively identify, assess, and manage risks associated with the use of medicines, thereby promoting patient safety and public confidence in the healthcare system.

Challenges of Pharmacovigilance in drug safety:

Pharmacovigilance faces numerous challenges in its mission to ensure drug safety.

1) **Underreporting of Adverse Events:**
   Only a fraction of adverse events are reported, leading to a lack of comprehensive data and potentially missing important safety signals.

2) **Incomplete Data and information:**
   Data may be incomplete, data entry errors, inconsistencies in reporting or lacking important details making it challenging to conduct through risk assessments and signal detection.

3) **Data fragmentation and integration:**
   PV data is often fragmented across multiple sources including spontaneous reporting systems, electronic health records, clinical trials and PMS. Integrating and harmonizing data from these disparate sources presents challenges in data management and analysis.

4) **Signal detection and validation:**
   Challenges such as false positives, confounding factors and variability in signal detection algorithms can complicate the identification and validation of safety signals.

5) **Delayed reporting:**
   Delays in reporting can impede the swift implementation of risk mitigation strategies.

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