Pharmacy intelligence as a strategy for research, development and manufacture of medical products

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Pharmaceutical intelligence (PI) refers to the use of automated algorithms to perform tasks which traditionally rely on human intelligence.. PI utilizes systems and software that can interpret and learn from the input data to make independent decisions for accomplishing specific objectives. It popularly comprises of machine learning and artificial neural network. Such technology elevates the speed of execution of complex program. Over the past few years, the use of such technology has been explored in pharmaceutical industry. Its application is found in various facets of industry including drug designing, clinical trials, formulation development, manufacturing, regulatory, marketing to name a few. We will highlight the application in drug development, formulation development and manufacturing of medical products. At the drug development level, such intelligence assists to generate novel drug candidates, understand disease mechanism and aggregate information. It can also be used to predict the 3D structure or binding mechanism of the new drug molecule. Other applications include creation of molecule of desired properties or prediction of properties of the molecule. At the stage of formulation development, this assists in minimising number of experimental runs to develop solid dosage forms. It is also useful to solve problems during optimization of the formulation and thus estimate the design space. It is commonly applied to predict the phase behaviour of quaternary micro emulsion forming systems consisting of oil, water and two surfactants. Manufacturing of these products also uses PI to follow the design space. It improves understanding of how the critical quality attribute contribute to overall quality of the drug product. It is applied to achieve batch to batch uniformity as well as desired standard of the product by in-process testing analysis. Increased application of this technologically driven approach for development and manufacturing of medical products can assure higher regulatory compliance with respect to quality of the product.