EDITORIAL

THE NEED FOR NOVEL PEDIATRIC PHARMACEUTICAL PRODUCTS

The present editorial is prompted by two articles in this issue of the journal by: 1) Sempombe et al., on the development of a thin layer chromatography densitometric method for assay of folic acid, and 2) Abwova et al., on the formulation of a furosemide dispersible tablet for pediatric patients. The connection between the two articles is that they both address formulations that are related to the medical needs of children. In recent years the unique needs of this specific population have become more widely appreciated. Firstly, as for all pharmaceutical products quality is essential for a medication to be of value to a patient. Secondly, novel formulations that address unmet needs will always be in demand.

The paper by Sempombe et al., reports on a High Performance Thin Layer Chromatography (HPTLC) assay for folic acid, an essential vitamin that is required to prevent neural tube defects which may occur during fetal development. While it is possible for pregnant women to obtain adequate amounts of folic acid from the diet, in many cases this does not occur and requires supplementation either through fortified foods or folic acid supplements. As for any pharmaceutical, the quality of the drug product is critical to ensuring safety and efficacy. In order to assess and monitor the quality of folic acid products, accurate and reliable assays are required. Rapid assays are invaluable in order for regulatory agencies to be able to monitor the quality of large numbers of products on the market. Low quality, adulterated or counterfeited products must be detected before reaching consumers. The need for such assays is even more critical in resource constrained countries, as the authors point out, where allocations to healthcare systems are below the levels needed.

The paper by Abwova et al., investigates a new formulation for the delivery of furosemide in pediatrics, which is not available locally as a pediatric formulation. The lack of oral pediatric formulations often necessitates compounding of formulations based on manipulating adult-size tablets or capsules into liquids. Compounded formulations, however, are limited by the potential for dosing errors and drug stability issues. Drug-excipient compatibility may be unavailable or difficult to predict considering the variations in raw materials among different suppliers. Complicating the stability aspect is that the refrigeration requirements for many compounded liquids are not available for a large portion of the local population.

The other factor of critical importance for oral pediatric formulations is the undesirable organoleptic properties, such as bitter taste, of many active pharmaceutical ingredients. This complicates the compounding process as the pharmacist may need to consider the use of sweeteners and flavors to improve taste, flavor, texture and mouthfeel. In the absence of excipients which address the sensory characteristics of the compounded product, there is a risk of poor patient compliance due to the child being unwilling to take the medicine.

Dispersible tablets provide an alternative that address the dosing accuracy, stability and organoleptic limitations of compounded formulations. There has been much interest in dispersible tablets in recent years as the lack of pediatric (child-size) formulations has been brought into focus. Other oral technologies that may be used for pediatric formulations include solutions, suspensions, emulsions, drops, chewable tablets, orally disintegrating tablets, mini-tablets, films, powders for redispersion, sprinkles and multi-particulates. The choice of which formulation(s) to employ for a given drug will depend on several factors including the dose, the drug's physicochemical properties, bioavailability, taste and stability. Alternative routes of administration are also possible depending on the drug, its indication and the benefits of the alternate route.

Pediatric formulations cannot be manufactured without suitable excipients. Given the differences in development, metabolism, excretion and pharmacology between children and adults, excipients may exhibit

different safety profiles in pediatric patients. Since most drug products are initially developed for adults and then later for children, gaps exist in the toxicological profile of many excipients. Consequently, more caution is needed when using excipients without an adequate history of safety in children. Formulation scientists, will therefore have a more limited choice of which excipients they can use and the daily use levels at which they use them.

While the development of pharmaceuticals for pediatric patients has long lagged behind that for adults, recent initiatives have led to increased interest and studies in this field. As the understanding and research of pediatric formulations grows, pharmaceutical manufacturers will be better able to address the therapeutic needs of children through the use of more patient-centric products.

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