The pediatric population is very different from adults and corresponds to a complex and heterogeneous group, from preterm newborn infants to adolescents, with a spectrum of different pathophysiology associated with growth and development. The dynamic process of maturation profoundly affects the absorption, distribution, metabolism and excretion of medicines and, consequently, the response to therapy. As a result, the pediatric population requires age-appropriate formulations, but the development of such particular medicines represents, almost always, a major challenge to the pharmaceutical industry. Pediatric patients have therefore been described as ‘therapeutic or pharmaceutical orphans’ since the majority of proprietary medicines do not have pediatric indications and are thus used ‘off-label’ (Shirkey, 1963; EMA, 2007; WHO, 2007; Nahata and Allen, 2008; Carvalho, 2012).

The community pharmacy setting provides age-appropriate formulations by means of pharmaceutical compounding, the preparation of customized medicines in order to meet the individual needs of patients, as follows:

- Need for alternative dosage forms: most medicines are available as solid dosage forms, namely tablets and capsules, which frequently represent a problem for the pediatric population (Figure 1). Oral liquids, on the other hand, are easier to administer, may be rapidly prepared and flavoured (according to individual preferences), and allow dosing flexibility (by variable volumes) (Carvalho, 2012). The community pharmacy setting is able to prepare customized oral liquids, which may be supplied in single-dose oral syringes in order to ensure adequate dosing and administration (Figure 2).

- Need for particular dosage strengths: proprietary medicines are available in standardized dosage strengths but the pediatric population requires personalized strengths, based on the age and body weight or surface area (Carvalho, 2012).

- Need for alternative raw materials: there are specific raw materials that are not recommended to pediatric patients (e.g. ethanol and propylene glycol). In addition, there are raw materials which may not be well tolerated as, for instance, colorants (sensitivity), lactose (intolerance) and phenylalanine (phenylketonuria) (Carvalho, 2012).

- Need for alternative organoleptic characteristics: the flavour, colour and texture of medicines are determinant factors in pediatric patients' compliance to therapy (Carvalho, 2012). Nowadays, the community pharmacy setting is able to personalize the organoleptic characteristics of medicines and offer modern dosage forms adapted to the individual preferences of pediatric patients as, for instance, lemon-flavoured lollipops (Figure 3).

Compounded medicines are an invaluable therapeutic alternative for the pediatric population and the community pharmacy setting plays a major role in meeting the needs of these complex patients.

References


