
CHILDREN'S KNOWLEDGE OF MEDICINES

Implications for health education

Pilar Aramburuzabala*

In order to get information about children's knowledge on medicines, a questionnaire with semi-open and open questions was applied to 152 children, ages 10 to 13, in two medical centres in a Spanish town. Results indicate that children have limited knowledge about medicines, which is an indicator of the potential risk to which they are exposed. There is a profound lack of knowledge about the attribution of efficacy of the medicine, since it is linked to external characteristics such as flavour and place where it is acquired. Children's knowledge has coherence and internal logic, which will predictably facilitate the planning and implementing of the necessary educational programs about medicines, and which should be adapted to their level of development.

Keywords: knowledge, medicines, children, health education

Children's knowledge of medicines

The study of the use of medicines has been mainly done from a biomedical and pharmacological perspective. According to this perspective, medicines are substances that are useful for the treatment and prevention of diseases, and modification of healthy biological status such as control of the reproductive function and appetite suppression or stimulation.

The biomedical studies on medicine use focus on varied topics like: development of new products, analysis of health risks and efficiency on specific populations, development of international classifications and consumption quantification.

* Universidad Autónoma de Madrid (Madrid/Spain).

Socioeconomic studies could be added to this group. In fact, nowadays medicines are one of the treatments of most diseases with a better cost-effectiveness relation. This situation does not seem to be going to change in the near future. On the contrary, medicines play an increasingly important role in society and contribute to control the costs of public health.

However, currently biomedical professionals begin to accept the existence of non-medical factors that affect medicine use, and the need to carry on interdisciplinary studies that include the contribution of education specialists, anthropologists, sociologists, and psychologists. Within this group some studies have focussed on structural factors that affect medicine use such as the effect of publicity (Lewis & Lewis, 1974; Atkin, 1978; Rossiter & Robertson, 1980; Zuckerman & Zuckerman, 1985; Byrd-Bredbenner & Grasso, 2000). Others point out that children have more autonomy in medicine use than what the majority of adults could predict (Bush & Iannotti, 1992). For example, children may remind their parents when it is the time to take a medicine and take it by themselves; sometimes they make the decision of taking a medicine if they are at home by themselves (Vaskilampi, Kalpio, Ahonen, & Hallia, 1996), or take medicines at school by themselves. The maternal influence on autonomy in medicine taking behaviours has been studied by Mechanic (1964), Bush and Iannotti (1988), Sachs (1990), Sloan and Vessey (2001) and Bozoni, Kalmanti, and Koukouli (2006). To these it can be added other very important variables like social learning and cognitive development (Campbell, 1975; Sharaideh, Wafaify, & Albsoul-Younes, 2013), as well as the capacity of children to make decisions regarding medicine use (Lewis & Lewis, 1982, 1989; Aramburuzabala, 1997). Children have great influence on family power situations regarding illness and treatment. Early studies ignored them, possibly based on the assumption that parents make the decisions and children had to follow their directions. However, children definitely exercise their negotiation skills and their ability to make decisions when it comes to treatment and the use of medicines.

However, there are very few studies exploring the conceptual and ideological factors as they are reported by children, which places these factors within the framework of health and illness behaviours in a wider cultural context (Aramburuzabala & Polaino-Lorente, 1992; Aramburuzabala et al., 1996; Bush et al., 1996; Trakas & Sanz, 1996; Almarsdottir & Zimmer, 1998).

Children are, to a large extent, a good reflection of the culture that surrounds them. Their behaviours related to medicines and health care develop in an early stage of their life. Therefore, studying the knowledge and use of medicines in childhood is essential for knowing and understanding the process of acquiring health behaviour patterns, specially those related to the use of medicines. Such knowledge and attitudes will have a decisive influence upon the behaviour and the use of medicines in the adult stage, considering the lack of education on the use of medicines throughout life.

Children are social actors with their own perspectives on the social world. They receive messages about medicines as part of daily information. Not only the adults administer their medicines, but at times they take them themselves, they observe how their relatives use them, and are exposed to publicity of these products.

In this way all children build up beliefs and develop expectations regarding medicines that will affect their future behaviours in the use of medicines. From this we can infer the importance of early education on health and medicine use.

Children need information about medicines before they begin to use them independently or they are asked to collaborate in the treatment. Before planning educational programs regarding medicines, it is important to know what do children know about medicines, how do they use them, and what do they want to know about them. This information has to take into consideration the child's level of development (Hansen, Holstein, Due, & Currie, 2003; Holstein, Hansen, Due, & Almarsdottir, 2003).

The studies by Bush and Iannotti (1988, 1990) about how children develop and maintain their knowledge on medicines reveal that learning about medicines starts at very early ages and has a significant family influence. This knowledge is maintained relatively stable during the school life (Bozoni et al., 2006; and Hämeen-Anttila, Juvonen, Ahonen, Bush, & Airaksinen, 2006).

Knowledge is necessary but not sufficient for inducing health behaviours. Knowledge itself is not sufficient if children do not have the abilities or the capacity for acquiring a behaviour. The study by Bush, Iannotti, and Davidson (quoted in Bush & Hardon, 1990) demonstrated the existence of a negative relation between children's knowledge about medicines and their use expectations regarding common health problems.

These data suggest that the interest of educational programs on the topic of medicines should focus not so much on providing knowledge to children and their parents, but on the development of attitudes and beliefs that allow behaviour change from the knowledge that the subjects already have. The number of health education programs on medicines is increasing (International Pharmaceutical Federation, 2001; Hämeen-Anttila, Kempainen, Enlund, Bush, & Airaksinen, 2004; Hämeen-Anttila, Juvonen, Ahonen, Bush, & Airaksinen, 2005; Hämeen-Anttila, 2006; Hämeen-Anttila, Airaksinen, Vainio, Bush, & Ahonen, 2006; Ceboteranco & Bush, 2007). These programs should be based on information gathered from the children, and they should take into account the attitude of the involved agents such the teachers (Hämeen-Anttila, Airaksinen, Lappalainen, Bush, & Ahonen, 2006) and pharmacists (Ranelly, Bartsch, & London, 2000; Sleath, Bush, & Pradel, 2003).

It is necessary to obtain more information about what people really think and do regarding medicines. This necessity has arisen from research that demonstrates the following: i)

medicine prescription (that is, instructions for use, availability and security of such substances) are not always rational (appropriate, proper, correct); that is, patients do not always «receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community» (Holloway & Van Dijk, 2011: 2); ii) while demand for medicines by patients is high, compliance with treatment is low; iii) health self-care is so prevalent and spread out that the statistical information about medicine use probably refers to only a small percentage of the real use.

The study that is presented here comes up from the interest to give response to a series of questions regarding the real use of medicines in childhood from the children's perspective¹. The information gathered should contribute to establish the basis for educational intervention on the use of paediatric medicines that considers the child as an active participant (Hart, 1998; Sanz, 2003).

The objectives of the study are the following: 1) to obtain quantitative and qualitative data concerning knowledge of medicine by the childhood population of Segovia, in Spain; 2) to compare children's knowledge regarding pharmacological treatment for acute and chronic illness and surgical procedures; 3) to provide information that will allow to improve the direct communication between the child and the paediatrician as well as the knowledge of the child about medicine use, with the aim of making a rational use of paediatric medicines; and 4) to analyze the implications of this information for the development of health education programs that consider children as active agents in the treatment of their illnesses.

Research design

Based on the research objectives, a questionnaire was elaborated to gather the relevant data.

The study measures the following variables related to what children know about medicines: definition (therapeutic objective, external characteristics, own or distinguishing characteristics), routes of administration, secondary effects, dosing, source of prescription, expiration, and efficacy.

The following identification variables were used: age; gender; outpatient consultation (for acute or chronic illness) or hospital admission (for acute and chronic illness, or surgery); mother's employment; mother's educational level; parents' profession related/not-related to

¹ The study was funded by the Ernesto Sánchez Villares Foundation, of the Asturias, Cantabria, Castilla and Leon Pediatrics Society.

health care; number of medicines that the child takes (at present and frequently); number of medicines taken by other persons living in the household (at present and frequently); number of persons living at home; number of hospital admissions of the interviewed child; and number of chronic illnesses of the persons that live (or have lived) in the home requiring pharmacological treatment.

Sample and data collection

The study was conducted between February and April 2010. The sample of the study was composed by 152 children (73 boys and 79 girls) from the province of Segovia, in Spain. Table 1 presents the distribution of subjects by gender and age.

TABLE 1
Distribution of subjects by gender and age

Age	Girls	Boys
10	28	32
11	14	8
12	2	7
13	35	26
Total	79	73

The context of the interview was taken into consideration – outpatient consultation in the Health Centre Segovia I or admission to the General Hospital of Segovia. The situation of children as patient was 77.9% walk-in and 22.1% hospitalized. The illness that induces the visit to the medical centre is acute in most cases (81.7%). Most interviewed children did not have a chronic illness nor were taking medicines at the time of completing the questionnaire.

The incidental sample was selected in two medical centres for two reasons: in these centres we had access to a big number of children from the same area, and parents expressed their trust in a research conducted by known persons that are health professionals. Also, the centres provided adequate spaces for applying the questionnaires.

It was decided that the sample would have at least 150 children, since that number allows sufficient variability in the responses. In the health centre, nurses and paediatricians interviewed the children and read them the questions. Most parents self-applied the questionnaire. Once completed it, the interviewer would review the questionnaire with the parent and give the opportunity to solve any doubts.

Adolescents were excluded from the study because it was decided that the subjects should be in the stage of developing the psychosocial factors that affect the use of medicines. Ages 10 through 13 were selected because, according to Piaget's theory, they represent two different stages of children cognitive development and allow to make comparisons. Besides, children of this age group are already capable of providing enough information about the issues studied.

The demographic information obtained from the adults through the complementary questionnaire reveals that the person that accompanied the child to the health centre and completed the complementary questionnaire was usually the mother (88.2%). In most homes there are two (59.1%) and three (23.5%) children, and in no case there more than five. The family model is nuclear, composed by parents and children (83.2%). Only in some cases there are other persons in the household. The level of education of the mother was distributed in a balanced way among basic, medium and high level. In 57.9% of the cases mothers work out of the house. And in 22% of the cases one of the parents has a profession linked with health.

Consent was collected from children and parents after they were explained what are the objectives of the study and confidentiality was guaranteed. Children were interviewed apart from their parents in order to avoid possible contamination of the responses. Questions were read by the interviewer and children responded verbally. At the same time parents responded a self-administered questionnaire with socio-demographic data, and information about health history, illnesses, and pharmacological treatment of the child and other members of the family that live (or have lived) in the home.

All children and parents approached accepted to collaborate in the research. All children were motivated and cooperative.

The information gathered in the health centre was obtained during the medical consultation. The 10 to 12 year old children went to the doctor due to medical problems, while the 13 year old children went for regular check-up. Every day questionnaires were administered to the first two children attending the centre and meeting the age requirement. The questionnaire was applied by three teams of nurses and paediatricians. Children interviewed at the hospital were admitted due to acute illness, chronic illness, or surgery. Questionnaires were applied by a nurse and a paediatrician. When the medical condition of the child so required, an appointment was made for another day. Responses were handwritten.

Training of interviewers was done during the pilot study. Items were group reviewed. The interviewers already knew the children and their parents, which resulted in a warm and open relation during the interviews.

Questionnaire description

Questionnaires were composed of semi-open (19) and open questions (5). This instrument allowed to collect information from a large number of subjects without interfering significantly with the professional activity of the participant paediatricians and nurses since it does not require much time. It was preferred to use semi-open questions instead of closed questions because there are not sufficient studies about the topic that could offer codes for closed and predetermined responses. Therefore, children were allowed to respond openly, although specific responses were predetermined. Responses that were not predefined were written literally in order to be coded afterwards. The design of the questionnaire corresponds to an adaptation of the one elaborated by Aramburuzabala and Polaino-Lorente (Aramburuzabala, 2000).

Correct answers were coded as 1, and incorrect answers were coded as 0. Data were coded and analyzed statistically with the SPSS program. Besides, a qualitative analysis was done for the responses to open questions.

Reliability, taken as internal consistency, was determined through Crombach alfa equation. The coefficient obtained is 0.4263. Although it is not so high, it is highly significant ($p = 0.0000$).

Results

Medicines are defined by 78% of the children as things that are good for getting better.

The majority of the children (84.9%) consider that the oral route is not the only way to take medicines, and they acknowledge other routes of administration (92.3%) – the most named are: intravenous, eye, nasal, and rectal. They know that the same medicine can have different presentation formats (82.9%) and different colours (62.9%), although there are discrepancies in the intra-subject responses for similar or related items. For example, 51.3% of the children interviewed do not know that a red pill can be the same inside as a green pill.

According to 61.8% of the children interviewed, they always know what each medicine they take is for.

For 67.1% of the children, not all medicines are good for health. The efficacy of a medicine is related to the size of the pills (53.0%), the flavour of the medicine (61.3%), the source of the prescription and the place where it was acquired. For 60.7% of the children, the medicines that are prescribed by doctors are better than other medicines, and for 37.8%, the medicines that are bought in a pharmacy always help you to get better. And, for 95.3%, recovery is faster if you take more medicines.

When children are asked if taking medicines without being ill prevents illnesses, most of

them (98%) give an inaccurate answer. The majority (93.4%) responds that taking medicines without consulting the doctor can be dangerous, while 82.1% considers that it is always necessary to consult the doctor before taking a medicine. Among the medicines that can be taken without going to the doctor, the most named are antipyretic and analgesic such as Aspirina®, Gelocatil®, Dalsy®, Termalgín®, and Frenadol® (56%), followed by medicines «for the head» (5%) and cough mixtures (4%). Some answers show mistaken knowledge. For example, 6% of the children believe that no medicine can be taken without consulting the doctor; others responded that you can take again, without consulting, a medicine that you have taken before (two children 10 and 13 years old), medicines for children (10 years old), and the ones that are kept at home (13 years old). Besides, it is worrying the fact that 3% of the children (a 10 year old and four 13 years old) consider that antibiotics can be taken without having to consult the doctor.

Regarding knowledge about side effects of medicines, 64.9% of the children show knowledge of the existence of such effects in some medicines. When asked if it could be dangerous to take medicines for a long period of time, 91.2% of the children gave incorrect answers².

With regard to medicines expiration, the majority of the children know that medicines go bad with time (84.1%), that the container should specify the expiration date (75.7%), and that using expired medicines can be dangerous (92.7%). 72% of the children that know that medicines go bad with time have knowledge about the expiration date that is written in the containers. Special attention should be given to the group of children that gave dangerous or incorrect answers and the one that did not know what to respond (28%). Among them, 6% responded that it cannot be known if the medicine has expired. Others point out that it can be known if the medicine is not good anymore because it smells bad or tastes bad, it changes its colour, or by asking the doctor or the pharmacist, etc. Most children know that taking a expired medicine can damage the organism (60%), and some even mention death (4%). Among 10-11 year old children, an expired medicine can be dangerous because it has no effect (10%).

The percentages of children who responded «I don't know» to the questions related to knowledge about medicines are low (between 1.3 and 1.5%, depending on the question).

Children offer their explanations in concrete terms according to their age and based on limited knowledge, since the education that they receive about medicines is limited. Lack of awareness about the limited knowledge that they have could cause medicine misuse behaviours. Health education programs should take in consideration children's perception of their knowledge, and develop them starting from their perception.

² «It depends» is considered a correct response.

These results allow to interpret that children have more knowledge about routes of administration, presentation formats and expiration, than about other measured aspects. Knowledge is limited regarding topics such as prevention, side effects and efficacy linked to the source of prescription, place of acquisition, length of treatment and dose.

Data indicates that the interviewed children trust the efficacy of the medicine, although they show confusion since for them the efficacy depends on the source of prescription and place of acquisition. This trust is also manifested regarding doctors.

Some of the data provided by the children reveal a lack of knowledge that can be dangerous. For example, a high percentage of children believe that they always know what the medicine that they are taking is for. Besides, for a significant number of children to take medicines without being ill prevents illness. This could be conditioned by the recent experience of vaccination in the Health Centre (at 10 and at 13 years). On the other side, the concept of secondary effects is not evident in all children, nor the possible risk by the extended use of specific medicines. There are very few cases where it was observed a consistency in the responses about knowledge of medicines. Moreover, the answers denote a limited knowledge, and in many cases not related with other concepts about the body acquired in school, and contradictory (for example, a child can say that a medicine could have different colours, and at the same time say that a red pill cannot have the same inside as a green one).

The Pearson's correlational analysis indicates that the knowledge of boys and girls is similar. There were not found significant linear correlations between the scale items and the number of medicines that the child is taking at the present, the number of medicines taken by other persons living at home, the number of persons living at home, the number of hospital admissions of the child that was interviewed, and the number of chronic illnesses of the persons living at home and requiring pharmacological treatment.

However, significant linear correlations between some children's knowledge on medicines and specific variables measured were found. The following are underlined:

- Age: older children know that the colour of a medicine does not affect its efficacy ($r = 0.52, p < .001$). This higher knowledge could be related with cognitive development and with experience;
- Rural/urban environment: children from rural areas tend not to know that medicines expire ($r = -0.30, p < .001$) and consider that the efficacy of the medicine is related to the fact that it is bought in the pharmacy ($r = 0.41, p < .001$);
- Educational level of the mother: the children of mothers with higher education know that efficacy of a medicine is not related to its size ($r = 0.42, p < .001$);

- Health profession of parents: the children of parents with a health profession tend to give correct answers when asked if all medicines are good for health³ ($r = 0.60, p < .001$).

Conclusions

Below are the most important conclusions of the study.

In principle, all children are capable of providing abundant and detailed information about medicines, which indicates how significant they are for them. Although they are familiar with medication, their knowledge of it is limited.

Children's limited knowledge about medicines is an indicator of the risk they take upon the use of medicines. Data obtained from this study could be complemented by the caretakers' perspective.

Children keep on viewing the doctor as an authority, with a high level of knowledge, which is very positive for the efficacy of the health education programs.

It is observed a profound lack of knowledge about the attribution of the efficacy of the medicine to external characteristics such as flavour, size and place of acquisition, and aspects such as dose and treatment duration.

In general, responses suggest that their knowledge has a level of coherence and internal logic, which predictably should facilitate planning and implementation of educational programs about medicines. However, some contradictions are found in responses given to questions with similar content.

Children's age has shown to be a factor that influences but is not determinant in the configuration that they make about the process of recovering with the use of medicines. In the study it was expected that 13 year old children, with more cognitive resources than 10 year old children, would have significant higher knowledge about medicines, considering also that they have more experience in the use of medicines. However, 13 year old children, in relation to 10 year old, express similar limited knowledge about medicines. All this leads to conclude the necessity of developing health education programs that are adapted to the characteristics of each level of development.

Due to the size of the sample, the information gathered in this study is not sufficient for analyzing if the level of knowledge of children with chronic illness is higher to the children without chronic illness, and if hospital admission increases the level of knowledge in children.

³ «It depends» is considered a correct response.

Implications for health education

To conclude this work, we present a description of the implications of the results for the health education field.

In Spain, knowledge and attitudes of children regarding health, illness, and medicines develop almost exclusively through personal experience and family influence. There is no school curriculum for health education and health education programs for adults are limited, and do not include the topic of medicines. Therefore, the education of parents is important, not just to keep the health of the family, but also to educate children on the topic of medicines. They should know why it is important that children be educated in medicine use, when children should learn about medicines, what can be done so they learn about medicines, what do they need to learn, and where can they get more information.

According to the results of the study, children are very familiar with medicine use and, although their knowledge is limited and shows some attitudes in favour of irrational use, they are more competent with regard to medicine use than most of the adults would like to believe.

Regarding self-care and self-medication, this study makes evident that children are not well prepared to be responsible medicine users. Data obtained indicates that their knowledge is not sufficient and, in some occasions, it is contradictory. Children's education in the use of medicines is essential, if we want to encourage gradual transfer of responsibility for medicine use in ways that respect parental responsibilities and the health status and capabilities of the child. Children need to know, among other things, what medicines are, why people use medicines, which are the steps for using them and what they should know about each medicine that they take.

Cognitive development of children is another aspect to consider for the design of educational programs about medicines. Children's decisions should be based on knowledge. The children listen in an active way and observe the behaviour of the persons in charge of their health and recovery in case of illness, but there is a very limited space for them to act.

The study shows that children are interested in the topic of health and medicine use. Nevertheless, the limited knowledge that they possess about health and medicine leaves them with the desire to make sense out of the complex information that they hear and observe, taking also into account that their cognitive and logic capacities are in the process of developing. It is necessary that they understand what happens to the body when they get sick, why there are steps to follow regarding the treatment, which are the options for treatment, why their autonomy regarding treatment is limited, what happens to the body when they take medicines, and how do they get well.

However, knowledge alone is insufficient. It is also necessary to study the perceived and real ability of the child for carrying on the desired behaviour regarding treatment.

Resources for information about medicines should be adjusted to the level of cognitive development of the different age groups to be addressed. It is also recommended that they be pre-evaluated for measuring the impact on the children.

All children are capable of giving a large quantity of information about treatment and medicine use, but the analysis of the responses reveals the amount of information that is organized in the child's mind. Information about treatment and medicine use does not imply automatic understanding. The understanding depends on the interaction between information and cognitive level. Many times the ideas that children have about treatment and recovery from illness are unexpected and surprising. Their responses have an internal logic; for example, when they say that medicines that are prescribed by physicians and the ones that can be purchased at pharmacies are better than the others. Doctors, because they represent authority and they have more knowledge about recovery. And the pharmacy because it is the common place for acquiring medicines. These ideas prevail over the biological, scientific concepts that they have acquired in the school.

Health education programs should be based on a psychological analysis of the children's intellectual level of development. It is important to consider not just their age, but also their comprehension of the information as well as their representation of what is happening. This way, the objectives, the contents and the learning sequence will help them to assimilate the contents. Knowing the spontaneous ideas that children have will contribute to motivate them. Such programs should recognize the children's previous concepts and make them aware of their contradictions by comparing them with the contradictions of other children. Besides, it is necessary to take into account the developmental changes upon the child's conception of medical procedures.

The study offers information that is necessary for health education programs. Some of the children's responses are alarming and have to be treated directly and specifically in the health programs. For example, according to a significant number of children, taking medicines without being sick prevents health. Others believe that they always know what the medicine they take is for, or are not aware of the risk implied by the prolonged use of specific medicines.

Regarding treatment compliance, it is necessary to point out that, in general, children are in favour of it. This aspect is vital for health educational programs regarding medicine use. On the other side, it is also important that children become aware of the limits of compliance. There are certain signs that inform patients that treatment has to be revised.

Public health institutions not only should define regulations for a rational use of medicines and their publicity, but should also collaborate in the development of educational programs

that encourage it. This includes the development of a school curriculum adapted to different ages and socio-cultural conditions.

On the other side, school programs designed for primary education about medicines should be developed by health educators that understand the levels of cognitive development and with experience in developing programs according to age.

These programs should be simple during the first grades, putting emphasis upon security; for example, the same medicine can have different colours and shapes; big pills are not better than small ones, and vice-versa. In the higher levels there should be considered more complicated topics such as compliance to treatment, vitamins and minerals, and secondary effects.

As methodological implications, we want to point out that there is a lot of work to be done through psychometric evaluation, but there is also need for observational studies. It is important to carry on studies that allow to generalize results with extrapolation to other contexts, ages and geographies. And finally, the research design used in this study could be applied to children of other age groups.

Contact: *Universidad Autónoma de Madrid, Facultad de Formación del Profesorado y Educación, Departamento de Didáctica y Teoría de la Educación, Ctra. de Colmenar km.16, 28049 Madrid – Spain*
Email: *pilar.aramburuzabala@uam.es*

References

- Almarsdottir, Anna B., & Zimmer, Catherine (1998). Children's knowledge about medicines. *Childhood*, 5, 265-281.
- Aramburuzabala, Pilar (1997, September/October). Children and adolescents as family members: What they know and do. In *Proceedings of the Conference Children and Medicines: Information isn't just for Grownups* (pp. 42-48). Rockville, MD: The United States Pharmacopeia.
- Aramburuzabala, Pilar (2000). *Percepción y consumo de medicamentos en la infancia* (Doctoral thesis). Facultad de Educación, Universidad Complutense de Madrid, Madrid, Spain.
- Aramburuzabala, Pilar, García, Marcelino, Almarsdottir, Anna B., Sanz, Emilio J., & Polaino-Lorente, Aquilino (1996). Decision makers in the treatment of childhood illness in Madrid, Tenerife and Chapel Hill. In Patricia J. Bush, Deana Trakas, Emilio J. Sanz, Rolf L. Wirsing, Tuula Vaskilampi, & Alan Prout (Eds.), *Children, medicines and culture* (pp. 155-171). Binghamton, New York: Haworth.
- Aramburuzabala, Pilar, & Polaino-Llorente, Aquilino (1992). Lugar de control y actitudes y conocimientos ante los medicamentos: ¿Interdependencia de dos variables en la salud infantil?. *Revista de Psiquiatría Infanto-Juvenil*, 3, 196-206.
- Atkin, Charles K. (1978). Effects of drug commercials on young viewers. *Journal of Communication*, 28, 71-79.
- Bozoni, Katerina, Kalmanti, Maria, & Koukouli, Sofia (2006). Perception of knowledge of medicines of pri-

- mary schoolchildren: The influence of age and socioeconomic status. *European Journal of Pediatrics*, 165, 42-49.
- Bush, Patricia J., & Iannotti, Ronald J. (1992). The socialization of children into medicine use. In Deana J. Trakas & Emilio J. Sanz (Eds.), *Studying childhood and medicines* (pp. 105-116). Athens: ZHTA.
- Bush, Patricia J., & Hardon, Anita P. (1990). Towards rational medicine use: Is there a role for children?. *Social Science and Medicine*, 31, 1043-1050.
- Bush, Patricia J., & Iannotti Ronald J. (1988). Origins and stability of children's health beliefs relative to medicine use. *Social Science and Medicine*, 27, 345-35.
- Bush, Patricia J., & Iannotti, Ronald J. (1990). A children's health belief model. *Medical Care*, 28, 69-86.
- Bush, Patricia J., Trakas, Deana, Sanz, Emilio J., Wirsing, Rolf L., Vaskilampi, Tuula, & Prout, Alan (Eds.). (1996). *Children, medicines and culture*. Binghamton, New York: Haworth.
- Byrd-Bredbenner, Carol, & Grasso, Darlene (2000). Health, medicine and food messages in television commercials during 1992 and 1998. *Journal of School Health*, 70, 61-65.
- Campbell, John D. (1975). Illness is a point of view: The development of children's concepts of illness. *Child Development*, 46, 92-100.
- Ceboteranco, Natalia, & Bush, Patricia J. (2007). Reducing antibiotics for colds and flu: A student taught program. *Health Education Research*, 23(1), 137-145.
- Hämeen-Anttila, Katri (2006). *Education before medication: Empowering children as medicine users*. Kuopio, Finland: Kuopio University Publications. Retrieved September 14, 2012, from <http://www.uku.fi/vaitokset/2006/isbn951-27-0407-2.pdf>
- Hämeen-Anttila, Katri, Airaksinen, Marja, Lappalainen, Jouni, Bush, Patricia J., & Ahonen, Riitta (2006). Medicine education for schoolchildren: What do the teachers think?. *Health Education*, 106(6), 480-490.
- Hämeen-Anttila, Katri, Airaksinen, Marja, Vainio, Kirsti, Bush, Patricia J., & Ahonen, Riitta (2006). Developing a medicine education program in Finland: Lessons learned. *Health Policy*, 78(2-3), 272-283.
- Hämeen-Anttila, Katri, Juvonen, Mirja, Ahonen, Riitta, Bush, Patricia J., & Airaksinen, Marja (2005). What schoolchildren should be taught about medicines: Combined opinions of children and teachers. *Health Education*, 105, 424-436.
- Hämeen-Anttila, Katri, Juvonen, Mirja, Ahonen, Riitta, Bush, Patricia J., & Airaksinen, Marja (2006). How well can children understand medicine related topics?. *Patient Education and Counseling*, 60, 171-178.
- Hämeen-Anttila, Katri, Kempainen, Kati, Enlund, Hannes, Bush, Patricia J., & Airaksinen, Marja (2004). Do pictograms improve children's understanding of medicine leaflet information?. *Patient Education and Counseling*, 55(3), 371-378.
- Hansen, Ebba H., Holstein, Bjørn E., Due, Pernille, & Currie, Candace E. (2003). International survey of self-reported medicine use among adolescents. *The Annals of Pharmacotherapy*, 37, 361-66.
- Hart, Cleone (1998). Children as consumers. *BMJ*, 316, 1600-1603.
- Holloway, Kathleen, & Van Dijk, Liset (2011). *The world medicines situation 2011: Rational use of medicines*. Geneva: World Health Organization. Retrieved August 21, 2013, from <http://apps.who.int/medicine-docs/documents/s18064en/s18064en.pdf>
- Holstein, Bjørn E., Hansen, Ebba H., Due, Pernille, & Almarsdottir, Anna B. (2003). Self-reported medicine

- use among 11 to 15 year-old girls and boys in Denmark 1988-1998. *Scandinavian Journal of Public Health*, 31, 334-41.
- International Pharmaceutical Federation (2001). *FIP statement of principle: The pharmacist's responsibility and role in teaching children and adolescents about medicines*. Adopted by the Pharmacy World Congress, Singapore. Retrieved from www.fip.org
- Lewis, Charles E., & Lewis, Mary A. (1974). The impact of television commercials on health-related beliefs and behaviors of children. *Pediatrics*, 53, 433-435.
- Lewis, Charles E., & Lewis, Mary A. (1982). Children's health-related decision making. *Health Education Quarterly*, 9(2-3), 225-237.
- Lewis, Charles E., & Lewis, Mary A. (1989). Educational outcomes and illness behaviors of participants in a child-initiated care system: A 12-year follow-up study. *Pediatrics*, 84, 845-850.
- Mechanic, David (1964). The influence of mothers on their children's health attitudes and behavior. *Pediatrics*, 33, 444-453.
- Ranelly, Paul L., Bartsch, Karen, & London, Kamala (2000). Pharmacists' perceptions of children and families as medicine consumers. *Psychology & Health*, 15, 829-840.
- Rossiter, John R., & Robertson, Thomas S. (1980). Children's dispositions toward proprietary drugs and the role of television drug advertising. *Public Opinion Quarterly*, 44, 317-329.
- Sachs, Lisbeth (1990). The symbolic role of drugs in the socialization of illness behaviour among Swedish children. *Pharmaceutisch Weekblad Scientific edition*, 12, 107-111.
- Sanz, Emilio J. (2003). Concordance and children's use of medicines. *BMJ*, 327, 858-864.
- Sharaideh, Rawia, Wafaify, Mayyada, & Albsoul-Younes, Abba. M. (2013). Knowledge and attitude of school children in Amman/Jordan toward the appropriate use of medicines: A cross-sectional study. *Saudi Pharmaceutical Journal*, 21, 25-33.
- Sleath, Betsy, Bush, Patricia J., & Pradel, Françoise G. (2003). Communicating with children about medicines: A pharmacist's perspective. *American Journal of Health-System Pharmacy*, 60, 604-607.
- Sloand, Elizabeth D., & Vessey, Judith A. (2001). Self-medication with common household medicines by young adolescents. *Issues in Comprehensive Pediatric Nursing*, 24(1), 57-67.
- Trakas, Deana J., & Sanz, Emilio J. (Eds.). (1996). *Childhood and medicine use in cross-cultural perspective: A European concerted action*. Luxembourg: Office for Official Publications of the European Communities.
- Zuckerman, Diana M., & Zuckerman, Barry S. (1985). Television's impact on children. *Pediatrics*, 75, 233-240.
- Vaskilampi, Tuula, Kalpio, Olli, Ahonen, Riitta, & Hallia, Outi (1996). Finnish study on medicine use, health behaviour and perceptions of medicines and health care. In Deanna J. Trakas & Emilio J. Sanz (Eds.), *Childhood and medicine use in cross-cultural perspective: A European concerted action* (pp. 191-221). Luxembourg: Office for Official Publications of the European Communities.