

## Curriculum Development in Pediatric Education: A Systematic Review

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### Abstract

**Background:** Training of Pediatric residents is a dynamic process which should be changed as the nature and epidemiology of pediatric diseases change. We aimed to determine the educational needs of Pediatric residents.

**Materials and Methods:** In this systematic review after selecting appropriate keywords and their combinations, an extensive search was done in databases of Medline, EMBASE, ProQuest and Ovid, Web of Science, Cochrane Library, and Scopus as well as Persian databases, such as Magiran, Medlib, and SID, using equivalent keywords in Persian, to find related articles to Pediatric education. The full text of the articles was studied by two reviewers and the main findings were extracted and categorized. Quality of studies was evaluated using STROBE statement.

**Results:** Data from nine studies were entered in this study. According to the findings, the necessity of changing Pediatric resident curriculum seems to be necessary in accordance with the conditions of the community. So, subspecialties for Pediatric resident training should be considered; these items can be include: cardiology, development, hematology and oncology, endocrinology, infectious diseases, respirology, palliative care of neurology, emergency, neonatology, gastroenterology, nephrology, gynecology, child psychiatry, behavioral psychology, surgical specialties, orthopedics and adolescents, dermatology, ophthalmology, and otolaryngology.

### Conclusion

Pediatric residents need sufficient, specific training to enable them to competently investigate and treatment of children complaints. So, Pediatric resident curriculum should be developed to be in according to Pediatric educational needs, and also to support the learner's personal development by contributing to enhancing their self-respect and confidence, motivation and aspirations.

**Key Words:** Curriculum, Development, Education, Resident, Pediatric.

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## 1- INTRODUCTION

A curriculum is considered the "heart" of any learning institution which means that schools or universities cannot exist without a curriculum. With its importance in formal education, the curriculum has become a dynamic process due to the changes that occur in our society. Therefore, in its broadest sense, curriculum refers to the "total learning experiences of individuals not only in school but society as well" (Bilbao *et al.*, 2008) (1). Curriculum is a systematic and intended packaging of competencies (i.e. knowledge, skills and attitudes that are underpinned by values) that learners should acquire through organized learning experiences both in formal and non-formal settings. Good curriculum plays an important role in forging life-long learning competencies, as well as social attitudes and skills, such as tolerance and respect, constructive management of diversity, peaceful conflict management, promotion and respect of Human Rights, gender equality, justice and inclusiveness. At the same time, curriculum contributes to the development of thinking skills and the acquisition of relevant knowledge that learners need to apply in the context of their studies, daily life and careers. Curriculum is also increasingly called upon to support the learner's personal development by contributing to enhancing their self-respect and confidence, motivation and aspirations (2-4).

Curriculum development is defined as planned, a purposeful, progressive, and systematic process to create positive improvements in the educational system. Every time there are changes or developments happening around the world, the school curricula are affected. There is a need to update them to address the society's needs. Curriculum development has a broad scope because it is not only about the school, the learners, and the teachers. It is also about the development

of society in general. Curriculum development is a process of improving the curriculum. Various approaches have been used in developing curricula. Commonly used approaches consist of analysis (i.e. need analysis, task analysis), design (i.e. objective design), selecting (i.e. choosing appropriate learning/teaching methods, and appropriate assessment method) formation ( i.e. formation of the curriculum implementation committee / curriculum evaluation committee), and review (i.e. curriculum review committee) (5, 6). Residency programs are required to ensure their residents' readiness for independent practice. However, this determination is too often based on insufficient direct observation of behaviors and inadequate assessment methods that focus on specific dimensions of residents' abilities rather than their integrated performance (7, 8).

Residents must learn to assess the medical literature and apply it clinically. New accreditation requirements for residency training programs require residents to have educational experiences that allow them to demonstrate competency in the following areas: (1) patient care, (2) medical knowledge, (3) practice-based learning and improvement, (4) interpersonal, and communication skills, (5) professionalism, and (6) systems-based practice. Residents' competence must be assessed with dependable measures (3, 4, 9). Monitoring and evaluation of the implementation of the curricula and its responsiveness to new challenges and requirements is also a critical element which needs to be assessed (10, 11). Organizing curriculum (activities, environments, goals, knowledge, learner and teacher interests, social conditions, technologies, values, etc.) as educational content is a series of judgments. Judgments are necessarily based on the type of knowledge, determining the highest value of knowledge for individuals, the scope and consequence of knowledge, how to focus on the learner's

demands, exploring the type of technology needed to expand or purchase, etc. (12). Pediatrics is one of the fields in medical science whose graduates at the PhD's degree are trying to meet and promote the health of newborns, infants and adolescents. Pediatric doctors specialize in the treatment of children from birth to early adulthood. They provide routine preventive health examinations, and diagnose and treat a wide range of illnesses. The American Academy of Pediatrics recommends people is under pediatric care up to the age of 21 (13).

One of the most important managerial resources in the health system is the existence of efficient, competent and strong human resources in an organization. In 2006, the World Health Organization reported this as an investment for today and the future. In this regard, it is essential to strengthen and educate the human resources and develop a curriculum that meets the needs of society (14). In fact, the study of learning needs is one of the most important components of developing a strategic training program that can take place in general or in local situations; priorities and resources should also be considered in addition to the needs. Educational needs can be characterized by inadequate knowledge, behavioral skills, or conditions that prevent the work from being done satisfactorily, but can be addressed through education (15-17).

According to a study, nursing educational programs were responsive to meeting only 18% of their educational needs, and the quality of providing programs was at a poor level. Davis writes in this regard: "Those programs are satisfactory for doctors or audiences, which have been designed to be in accordance with the needs, opinions and views of the audience, and attractive and responsive to their most important needs, as well as can upgrade their professional capabilities" (15,18). Regarding the fact that multiple studies

referred to different educational needs and due to the absence of a comprehensive study on the educational needs of Pediatric residents for the development of pediatrician education curriculum; this study was conducted to determine the educational needs of residents of pediatrics.

## **2- MATERIALS AND METHODS**

### **2-1. Method**

After choosing appropriate keywords and their combinations, an extensive search was done in databases of Medline, EMBASE, ProQuest and Ovid, Web of Science, Cochrane Library, Scopus, and CINAHL using keywords such as: "Educational needs, Pediatrics, Pediatric resident, Residency program, Needs assessment, Development, and Curriculum". In addition, SID, Magiran, Medlib, Iran doc, and Google Scholar were searched from inception until June 2018 to find equivalent keywords in Persian. A manual search was performed through three steps: 1) assessing bibliography of relevant studies 2) contacting authors in order to get access to unpublished data and 3) search for relevant theses in ProQuest database. No language limitation in the search was considered. Different combinations of the keywords were used for obtaining the maximum relevant articles.

After excluding same records (due to repetition, non-availability of full text, etc.), two independent researchers screened titles and abstracts and then full texts of probably relevant articles were read. Disagreement was resolved by discussion, if necessary, a third independent party was consulted (Professor of Pediatrics). Full texts of the articles, their goals, used tools, studied variables; interventions and findings of the studies were assessed. Extracted data from each study were reviewed and organized into the form of a table.

## 2-2. Quality Assessment

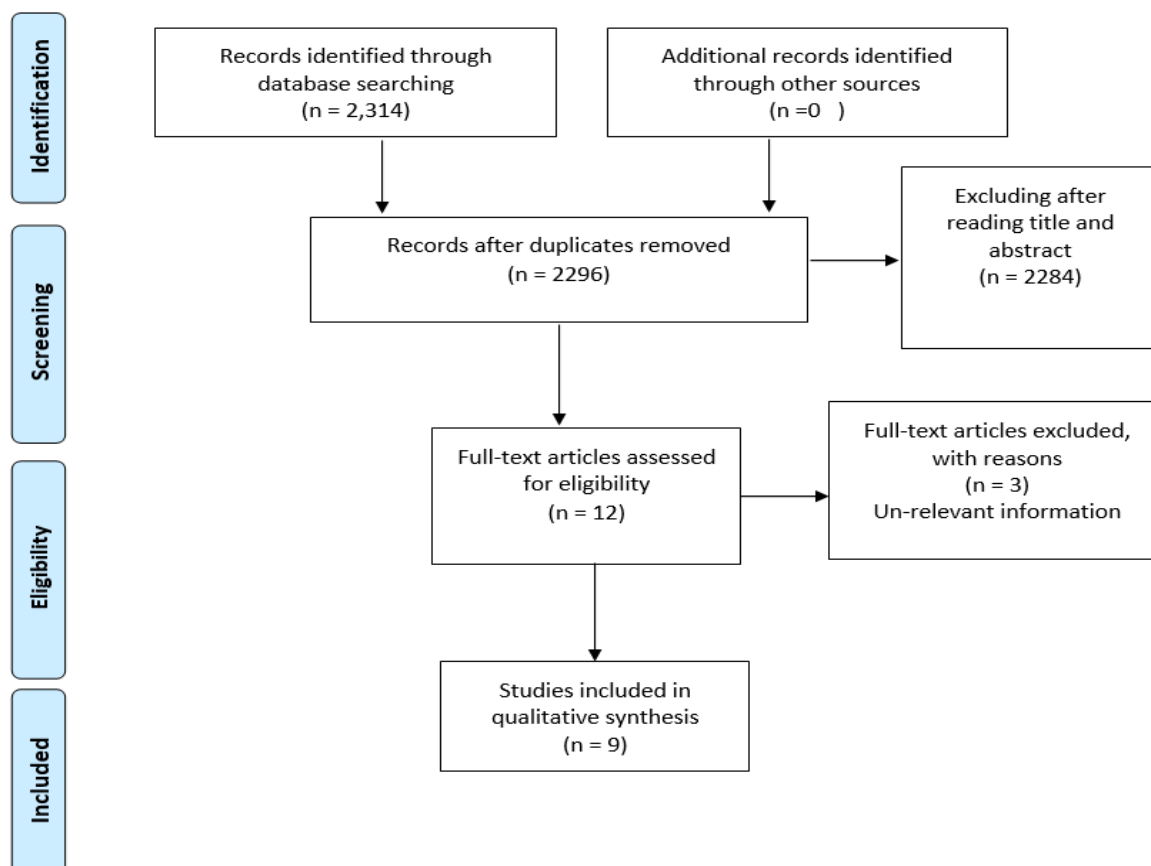
Quality of studies was evaluated using STROBE statement (28) for cross sectional by two authors study, including objectives, study design, setting, bias, statistical methods, main outcome, limitations, interpretation and generalizability. A summary of the main findings of the study was developed. Since the methodology of the reviewed articles was not the same, and in addition to interventional studies, observational studies and qualitative studies were also included in the review; therefore, in order to data synthesis, the narrative approach with thematic summaries were used. The similar findings of studies were categorized as themes.

## 2-3. Data extraction

A researcher-made checklist was independently used by two authors to collect the required data such as name of first author, year of publish, region of study (country and city,), measurement instruments, sample size, and baseline, study design, and main outcomes, were used.

## 3- RESULTS

Finally nine studies (one Persian article and eight foreign articles) were included in this systematic review. Characteristic of 9 studies included into systematic review is shown in **Table.1**. In primarily search in national and international databases, 2,314 articles were identified; 2,284 articles were excluded after reading title and abstract. Also, 12 articles were assessed in detail. Finally, 9 articles were included into systematic review (**Figure.1**).



**Fig1:** Flowchart of included studies.

Knight et al. designed a standard case-based curriculum for pediatric residents in the field of child growth, development, behavior, and adolescent medicine, which embraces guidelines for monitoring the health of Bright Futures (19). Batthish et al. investigated 60 pediatric residents at the Hospital for Sick Children through online email (20). The basis of this study was to evaluate the use of online education modules, the application of an online educational degree for rheumatology, and the types of technology required on these sites. The results showed that 91% of respondents believed that learning would be strengthened through an interactive educational website that should include case-based teaching modules. There are several important Web-based technologies for entering educational units, including graphics and animation (86.4%), interactivity (93.2%), images (100%), live digital videos (88.9%), and links to papers and studies (88.6%). Pentiuk and Baker exploited Fellows as Teachers to try for designing a curriculum for education on gastroenterology among pediatric residents. The findings showed that, in spite of the limited time available for teaching residents, it is possible and useful to establish structured subspecialty curriculum using Fellows as Teachers (21).

In a study by Moravej and Dehghani (22) in Shiraz, Iran, 37 out of 58 pediatrics offices filled out the questioners (64%). Infections, in particular respiratory and gastrointestinal infections, were the most prevalent discomforts among the patients, followed by nutritional and growth problems. Other causes of patient referral were skin, eye, or ear problems or check up the baby. Johnson et al. demonstrated that 45 out of 59 residents at Children's Hospital of The Kings' Daughters (CHKD) completed focus groups and individual interviews. According to the requirements of the learner obtained owing to this

research, feasible public health training for residents embrace protected time for public health instruction, faculty development workshops, linkages with proper local organizations, and opportunities for residents to follow up their projects. These features can be exploited in curriculum design by residencies in order to prioritize the needs of learners in the development and implementation of public health education (23). Grant et al. evaluated the effectiveness of pediatric residency education in preparing graduates to manage neurological and neurobehavioral issues in practice by mailing 46 questionnaires to University of British Columbia (UBC), and reported that 74% of pediatric graduates stated that majority of the neurology courses for residency training can be programmed regarding general pediatric behavioral and neurological terms (for example attention-deficit/hyperactivity disorder or developmental delay), and would select to participate in the CME on such fields. Moreover, 28% of them would interest in less courses on complex neurological disorders managed at a subspecialty level (for example, chronic refractory seizures) (24). Douglas Jones et al. had an effort for linking process to outcome by studying the role of training the pediatricians to fulfill the healthcare needs. They found that the learning opportunities of residents should be more flexible in relation to the types of professional choices available to pediatricians. Further, integrated continuum learning can lead to increased probability of reasonable expectations for residency education, starting in medical school and continuing via a career in practice (25). Lieberman and Hilliard investigated the perception of the pediatricians regarding the adequacy of their residency training to prepare for clinical practice as well as the length of

compulsory required education. According to the results, positive views concerning the presented education programs were emergency medicine, neonatology, endocrinology, hematology, oncology, neurology, infectious diseases, and respirology. In addition, fewer adequacies were reported for gynecology, child psychiatry, behavioral psychology, surgical specialties, orthopedics and adolescents. Considering the role of the medical specialist, the strengths of training focused on medical expert, cooperation, ethical considerations and professional backgrounds and communication (26). Kumar et al. studied the opinions of

Canadian pediatric residents and pediatric residency program directors about different subspecialty fields through an online survey (27). The most significant subspecialties for resident training included cardiology, development, hematology and oncology, endocrinology, infectious diseases, respirology, neurology, emergency, neonatology, gastroenterology, nephrology, and respectively. Additionally, the less important ones were ophthalmology gynecology, genetics, orthopedics, metabolic disease, allergy and immunology, child psychiatry, adolescent medicine behavioral pediatrics, and dermatology, respectively.

**Table-1:** Characteristic of 9 studies included in this systematic review.

Authors, year, Reference	Objective	Study design	Setting	Bias	Statistical methods	Main results	Limitations	Interpretation	Generalizability
Knight et al. (19), 1997	😊	😊	😊	😞	😊	😊	😊	😊	😊
Batthish et al. (20), 2012	😊	😊	😊	😞	😞	😊	😊	😊	😞
Pentiuk and Baker (21), 2010	😊	😊	😊	😞	😞	😊	😞	😊	😊
Moraveji and Dehghani (22), 2013	😊	😊	😊	😞	😞	😊	😊	😊	😞
Johnson et al. (23), 2012	😊	😊	😊	😞	😊	😊	😊	😊	😊
Grant et al. (24), 2002	😊	😊	😊	😞	😊	😊	😊	😊	😞
Jones et al. (25), 2009	😊	😊	😊	😞	😞	😊	😞	😊	😊
Liebermaa and Hilliard (26), 1999	😊	😊	😊	😞	😞	😊	😊	😊	😊
Kumar et al. (27), 2008	😊	😊	😊	😞	😊	😊	😊	😊	😞

😊: Yes;; 😞 No.

#### 4- DISCUSSION

In this systematic review we aimed to determine the educational needs of Pediatric residents. To the best of our knowledge, this is the first systematic review addressing comprehensively educational needs of Pediatric residents. Curriculum should be developed to be in accordance with pediatric educational needs to obtain a comprehensive program to educate human resource. Nine studies were included in the systematic review. Knight et al. found case-based curriculum for pediatric residents in the field of child growth, development, behavior, and adolescent medicine, which embraces guidelines for monitoring the health of Bright Futures (19). According to Batthish et al., Web-based technologies could be strengthened learning these are including graphics and animation, interactivity, images, live digital videos, and links to papers and studies (20). Pentiuk and Baker showed that it is useful to establish structured subspecialty curriculum using Fellows as Teachers (21). Moravej and Dehghani found that pediatric residents have difficulties in their curriculum importantly regarding training-practice issue, suggesting a reduction in the periods of inpatient subspecialty training, and an elevation in the period of outpatient dermatology, ophthalmology, otolaryngology, and well-baby clinics (22).

Johnson et al. demonstrated feasible public health training for residents embrace protected time for public health instruction, faculty development workshops, linkages with proper local organizations, and opportunities for residents to follow up their project (23). Grant et al. concluded that adequate and certain educational programs are required for the pediatric residents to competently evaluate and deal with the neurobehavioral complaints and conditions in office and hospital practice of general pediatricians (24). Douglas Jones et al. found that the

learning opportunities of residents should be more flexible in relation to the types of professional choices available to pediatricians (25). The pediatricians mentioned that their residency had fewer adequacies for gynecology, child psychiatry, behavioral psychology, surgical specialties, orthopedics, and adolescents. The participants stated less adequacy of preparation as a medical expert on palliative care, as bereaved parents, and as manager of an office practice. Nevertheless, 80% thought that four-year education is enough (26). Kumar et al. found the most significant subspecialties for resident training included cardiology, development, hematology and oncology, endocrinology, infectious diseases, respirology, neurology, emergency, neonatology, gastroenterology, and nephrology, respectively (27).

##### 4-1. Limitations of the study

Despite of our attempt to do a comprehensive search in Persian and English databases, some of studies may be missed. Some of studies enrolled into our studies evaluated only perceived needs. It is required that future studies should be conducted according to both perceived and real needs.

#### 5- CONCLUSION

According to the results, four-year education for Pediatric residents is enough. However, there need to some change in curriculum. Subspecialties for resident training should be included; these include cardiology, development, hematology and oncology, endocrinology, infectious diseases, respirology, palliative care of neurology, emergency, neonatology, gastroenterology, nephrology, gynecology, child psychiatry, behavioral psychology, surgical specialties, orthopedics and adolescents, dermatology, ophthalmology, and otolaryngology. Also curriculum should be designed case- and Web- based. Curriculum should be more flexible in

relation to the types of professional choices available to pediatricians. The results of this our study can be used to develop pediatric curriculum.

**6- CONFLICT OF INTEREST:** None.

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