



Original Article

Assessment of experience and training needs in adolescent medicine: Perspectives from pediatricians

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ABSTRACT

Objectives: To promote adolescent health care in Taiwan, we conducted a national questionnaire-based survey to assess experience and training needs in adolescent medicine among pediatricians in Taiwan. **Materials and Methods:** A 13-item questionnaire was mailed to all physicians registered in the Taiwan Pediatric Association. Perceived importance, necessity, skill, and training needs for main adolescent health issues were reported anonymously on a 5-point scale. We also analyzed their experience and competence in management of these adolescent health issues compared with management of two common pediatric diseases, respiratory tract infections and gastrointestinal disease. Data were analyzed using descriptive statistics, the χ^2 test, paired *t* test, Spearman correlation, and logistic regression analysis.

Results: A total of 226 questionnaires were included in the final analysis. Pediatricians' perceived competence in adolescent health problems was lower than that for common pediatric diseases. The analysis showed a positive correlation between competence and experience in medical practice. A higher likelihood of case referral was associated with lower perceived competence. Most respondents rated these adolescent issues "very important" or "important" (60–88%), whereas few of them reported being "very knowledgeable" or "knowledgeable" (11–36%). Nevertheless, most doctors were "very interested" or "interested" (44–71%) in receiving further training. Adolescent health issues related to "obesity, nutrition counseling, and eating disorders;" "growth and development during puberty and endocrine disorders;" and "mental health" were perceived to be of highest importance, whereas the medical topics "obesity, nutrition counseling, and eating disorders;" "dermatologic disorders;" and "growth and development during puberty and endocrine disorders" were considered top priorities for further training.

Conclusion: Taiwanese pediatricians, perceiving suboptimal experience and competence in managing many adolescent health problems, consistently expressed strong interest in receiving further adolescent medicine training. We identified and prioritized their training needs for a wide variety of adolescent health issues. These findings are expected to help guide the development of integrative educational programs for pediatricians in Taiwan.

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1. Introduction

Adolescence is a period of transition from childhood into adulthood. During this crucial time, people are likely to experience immense biophysical and psychosocial changes that affect their lifelong well being [1]. Over the past two decades, the major causes of adolescent morbidity and mortality worldwide and in Taiwan

have changed to include more psychosocial and environmental factors, such as mental disorders, unexpected injuries, unplanned pregnancy, sexually transmitted diseases, drug abuse, and smoking [2–4]. However, teenagers are often mistakenly thought to be healthier than they really are. Their health problems are hence overlooked by the current health care system. A gap exists between their experiences and expectations when consulting a doctor, such as in assurance of confidentiality and specific discussion of their issues of concern [5]. To eliminate the health inequalities among adolescents, the World Health Organization has strongly encouraged improvement and provision of youth-friendly services worldwide [6,7].

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Most adolescents seek medical attention for physical illness in pediatric clinics, so pediatricians are usually regarded as their caretakers from childhood to adolescence. However, pediatricians have reported limited competence in dealing with certain adolescent health issues. Increasing awareness of unmet training needs in adolescent medicine calls for the development of educational curricula for physicians [8–10]. Therefore, a number of training programs in adolescent medicine have been developed mainly in the United States, Canada, Australia, and several European countries [11,12]. Many pediatricians, family doctors, and internists have been trained as adolescent medicine specialists and provide a multidisciplinary network of care for teenagers in these countries. Corresponding to this trend, a committee of adolescent medicine was established by the Taiwan Pediatric Association and has served mainly to promote development of education in adolescent medicine.

Emphasis in this emerging field has recently been placed on provision of various adolescent health care services, both hospital-based and school-based, in Taiwan [13,14]. Physicians are required to update their knowledge and apply to care for adolescents in these medical practices. Despite the importance, formal curricula in adolescent health and medicine are still lacking in current pediatric residency training. In addition, the perspectives of pediatricians toward adolescent health have not yet been investigated. The aim of this study was to evaluate the perceived importance, necessity, knowledge, and training needs in adolescent health issues among pediatricians in Taiwan to integrate adolescent medicine into pediatric residency education, and improve adolescent health care. In addition, we also analyzed their clinical experience and competence in managing adolescent health problems compared with that for common pediatric diseases in this national survey.

2. Material and methods

A questionnaire was developed on the basis of suggested training curricula for adolescent medicine in the literature and its validity was reviewed by experts in this field [9,11,13,14]. It contained 13 main adolescent health issues, covering a wide range of topics from physical illness (nutrition and obesity, sports and musculoskeletal disorders, skin disorders, and endocrine disorders), reproductive health (pregnancy and sexuality), mental illness (psychiatric disorders and depression), behavioral problems (physical and sexual abuse, violence, risks and injuries, smoking, and substance use), to socioenvironmental aspects (family, ethics, and adolescent counseling). For every health issue, questions were formulated as follows: “Is this issue important to adolescent health?”, “Is it necessary to provide health services regarding this issue?”, “Do you know about this issue?”, and “Are you interested in receiving further education on this issue?” These questions represented respectively the importance, necessity, knowledge, and training needs in adolescent health issues. Perception of these factors was independently scored on a 5-point Likert scale. In terms of importance, for example, scores ranged from 1 (very unimportant) to 5 (very important).

In another part of this survey, experience and competence in managing these adolescent health issues were compared with that of common pediatric diseases, such as respiratory tract infections and gastrointestinal disease. “How often do you see adolescent patients with these health problems in clinics?” and “How do you rate your competence in managing these health problems?” were formulated in the questionnaire. There were five frequency options ranging from “never or rarely” to “always” and five competence options ranging from “incompetent” to “excellent.” Case referral was self-assessed dichotomously in the following question “Do you need referrals to specialists other than pediatricians in managing

Table 1
Demographic characteristics of respondents (*n* = 226)

Demographic characteristics	<i>n</i> (%)
Gender	
Male	152 (67.3)
Female	70 (31.0)
Age (yr)	
<40	59 (26.1)
41–50	88 (38.9)
51–60	52 (23.0)
>61	25 (11.1)
Clinical site	
Medical center	26 (11.5)
Regional hospital	56 (24.8)
Local clinic	142 (62.8)
Practice period (yr)	
<10	45 (19.9)
11–15	52 (23.0)
16–20	46 (20.4)
21–25	35 (15.5)
>26	48 (21.2)
Geographical area	
North (Taipei, Keelung, Taoyuan, Miaoli, and Hsinchu)	92 (40.8)
Central (Taichung, Changhua, Nantou, and Yunlin)	60 (26.5)
South (Chiayi, Tainan, Kaohsiung, and Pingtung)	63 (27.9)
East/Offshore (Yilan, Hualien, Taitung, Penghu, Kinmen, and Lienchiang)	11 (4.8)

these health concerns?” The referral rate was accordingly represented by the percentage of positive responses.

We distributed the questionnaires to all registered members of the Taiwan Pediatric Association in the name of the Committee for Adolescent Medicine. Distribution was carried out by post followed by two rounds of reminder e-mails over a 2-week interval in January 2009. The two reminder e-mails were sent to all pediatricians regardless of their response status. The questionnaires were returned anonymously from January to February 2009. A survey containing inconsistent, out-of-range, or multiple answers to related questions was considered invalid.

Final entry of demographic data was summarized and compared with those of all registered pediatricians using the χ^2 test. In addition, levels of perceived experience and competence in managing adolescent health issues were compared with that of common pediatric diseases with the paired *t* test. Spearman correlation analysis was used to examine the relationship between perceived experience and competence. Two logistic regression models were also applied to assess independent association between certain demographic factors, perceived competence, and case referral status. We used multilevel ordinal logistic regression to determine the predictive factors of perceived competence. The independent variables included gender, age, type of clinical site (medical center, regional hospital, local clinic), and geographic area in this analysis. Moreover, binary logistic regression was carried out using case referral status as the dependent variable. Perceived competence was added as an independent variable in the latter analysis model. The statistical analysis was conducted with SPSS 17.0 (SPSS Inc., Chicago, IL, USA).

3. Results

A total of 247 questionnaires were completed, representing a response rate of 6.4% among 3836 members. After data verification, 226 completed questionnaires were included for final analysis.

Of the respondents, 67.3% were men, 31% were women, and 1.7% did not give their gender. In terms of clinical practice, 62.8% of respondents worked as general pediatricians in private clinics and

36.3% worked in hospitals. Most were 41–50 years old constituting 38.9% of respondents, followed by those younger than 40 years (26.1%) and those 51–60 years of age (23%). Most worksites were located in northern Taiwan (Taipei City, Taipei County, Keelung City, Hsinchu City, Hsinchu County, Taoyuan County, and Miaoli County), followed by southern Taiwan (Chiayi City, Chiayi County, Tainan City, Tainan County, Kaohsiung City, Kaohsiung County, and Pingtung County) and central Taiwan (Taichung City, Taichung County, Changhua County, Nantou County, and Yunlin County) (30.8%, 27.9%, and 26.5%, respectively). A total of 47.8% worked in an urban area, whereas the rest worked outside of a city (Table 1). Analysis using the χ^2 test showed that the demographic distribution of respondents was not different from the general population of registered pediatricians in the 2009 census ($p = 0.094$) (www.tma.tw/stats/stats15.asp, accessed November 2011). Eighty percent of respondents had more than 10 years' clinical pediatric experience, whereas approximately 44% reported having a very limited understanding of adolescent medicine. More than one-half of respondents reported that at least 10% of their patients were adolescents.

Our findings revealed that a number of adolescent health problems were seen with variable percentages in pediatric practice. The respondents' perceived experience in managing adolescent health problems was lower than that for common pediatric diseases ($p < 0.001$). Similarly, their levels of self-assessed competence were lower for adolescent health problems than for common pediatric diseases ($p < 0.001$). For each health problem, the perceived competence was positively correlated with the perceived experience in medical practice (Fig. 1). In the multilevel ordinal regression model, perceived competence in managing physical illness was independent of gender, age, type of clinical site, and geographic area. Male doctors are more likely than female doctors to report having better competence in reproductive health and behavioral problems, whereas doctors in older age groups were more likely to report better competence in mental illness and reproductive health than younger ones (Table 2).

Much higher referral rates were reported for adolescent health problems (56–92%) than for gastrointestinal diseases (17%) and

respiratory infections (10%). Table 2 describes the odds ratios of factors associated with a higher likelihood of case referral. The differences between physicians' gender, age, type of clinical site, and geographic area were not significant in the binary logistic regression model. Only perceived competence was negatively associated with referral status for adolescent health issues.

Most respondents rated these adolescent health issues as “very important” or “important” (60–88%), whereas only a few reported being “very knowledgeable” or “knowledgeable” (11–36%). Nevertheless, most doctors were “very interested” or “interested” (44–71%) in receiving further training. The percentages for perceived knowledge were generally lower than for perceived importance, necessity, and training needs in the respective areas (Table 3). The respondents reported better understanding of physical illnesses, such as obesity, dermatologic disorders, and endocrine disorders. The importance of “obesity, nutrition counseling, and eating disorders;” “growth and development during puberty and endocrine disorders;” and “mental health” were perceived higher than that of “violent risky behaviors” and “ethical, legal, and political issues.” This result was consistent with the priority of reported training needs. The ranking of perceived interest showed that “obesity, nutrition counseling, and eating disorders;” “dermatologic disorders;” and “growth and development during puberty and endocrine disorders” were considered top training priorities. Health issues ranked less important, such as “violent risky behaviors” and “ethical, legal, and political issues,” elicited less interest for further training.

4. Discussion

This survey primarily addressed Taiwanese pediatricians' experience and training needs in adolescent medicine. Pediatricians are seen as frontline guardians of adolescent health care, although adolescents constitute only a minor portion of patients in most clinics. Their clinical visits are usually for infectious or acute physical etiologies. Accumulating evidence has shown that over the last two decades, adolescents have increasingly presented with morbidity and mortality associated with psychosocial factors, such

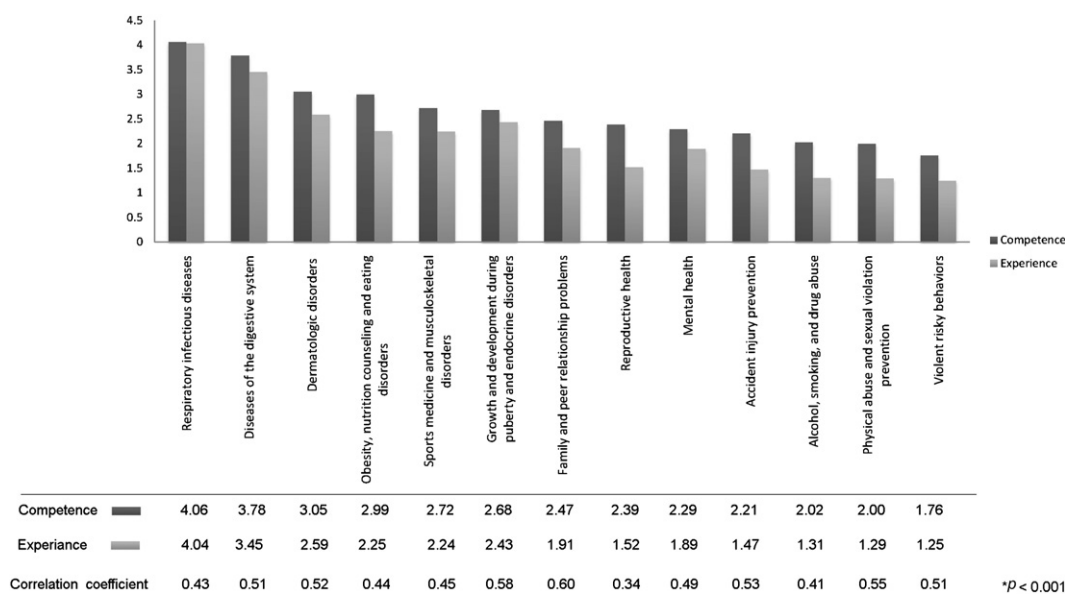


Fig. 1. Perceived clinical experience and competence in adolescent health issues compared with that of common pediatric diseases. Spearman correlation analysis was used to test the correlation between perceived competence and experience, $p < 0.001$. Experience: “How often do you see adolescent patients with these health problems in clinics?” scored from 1 (never or rarely) to 5 (always); competence: “How do you rate your competence in managing these health problems?” scored from 1 (incompetent) to 5 (excellent); referral rate: “Do you need a referral to specialists other than pediatricians in managing these health concerns?”

Table 2
Regression analysis of independent association between gender, age, clinical site, geographic area, perceived competence, and case referral

Group	Perceived competence ^a					Case referral ^b				
	Physical illness	Mental illness	Reproductive health	Behavior problem	Relationship problem	Physical illness	Mental illness	Reproductive health	Behavior problem	Relationship problem
	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
Gender										
Female	1	1	1	1	1	1	1	1	1	1
Male	1.08	1.48	2.08*	1.75*	0.99	0.88	0.93	1.51	1.42	1.01
Age										
< 40	1	1	1	1	1	1	1	1	1	1
41 – 50	1.16	2.01*	1.06	1.2	1.7	1.50	0.57	1.11	0.79	1.38
51 – 60	1.13	2.53*	2.48*	1.88	1.99	1.40	2.10	1.07	0.91	1.15
> 60	1.68	4.14**	2.92*	1.86	2.25	0.80	0.19	0.70	0.44	0.53
Clinical site										
Medical center	1	1	1	1	1	1	1	1	1	1
Regional hospital	1.6	0.97	1.23	1.17	1.79	0.86	0.48	2.46	1.28	0.83
Local clinic	1.3	0.6	0.79	0.64	1.34	0.41	0.40	1.01	0.71	0.39
Geographic area										
North	1	1	1	1	1	1	1	1	1	1
Central	1.00	0.83	1.65	1.36	0.77	1.66	0.99	0.61	0.63	0.90
South	0.94	0.7	0.92	0.79	0.48*	1.12	1.13	0.98	0.66	0.54
East/Offshore	2.34	1.21	0.91	1.07	1.28	1.34	0.56	0.35	2.40	0.63
Perceived competence						0.30**	0.18**	0.41**	0.27**	0.24**

* $p < 0.05$; ** $p < 0.01$

^a Multilevel ordinal logistic regression analysis was used with levels of perceived competence as the outcome variable.

^b Binary logistic regression analysis was used with case referral status as the outcome variable. A value of 1 indicated a necessity for referral in managing problems.

as sexuality, risky behaviors, substance abuse, and mental disorders [2–4]. The changing health needs of adolescents pose challenges in provision of medical consultations and mandate development of specific health care services for this age group.

In our study, pediatricians reported limited knowledge of these emerging problems. Lower perceived competence in management of these issues was correlated with lower perceived experience. Similar results were shown among general practitioners in an Australian study [15]. Health care providers seem to underestimate adolescent psychological and social health concerns [16]. In addition, most pediatricians in this study perceived themselves to be less competent in managing adolescent health problems than common pediatric diseases. This finding was also in agreement with a previous study in the United Kingdom, which showed pediatricians' lack of skills and confidence in tackling adolescent health problems in comparison with their management of asthma

[17]. Failing to recognize and properly treat adolescents' health problems may lead to increasing morbidity and mortality from chronic illnesses in adulthood. Pediatricians are required to at least be capable of identifying and not rejecting adolescents' health concerns and provide appropriate referral.

Our regression model found that a higher likelihood of case referral was associated with lower perceived competence. This finding may imply that insufficient experience and training in adolescent medicine leads to suboptimal confidence and competence in managing adolescent health problems. Another explanation may be that the higher referral rate reflects the diversity and complexity of adolescent health problems and hence requires multidisciplinary involvement in provision of appropriate and effective care. Providing collaborative health care for adolescents has been previously advocated both in the United States and Europe [14,18–20]. We encourage individual pediatricians to expand their

Table 3
Perceived importance, necessity, knowledge, and training interest in adolescent health issues among respondents ($n = 226$)

Parameters	High/very high importance (%)	High/very high necessity (%)	High/very high knowledge (%)	High/very high interest (%)
Obesity, nutrition, and eating disorders	87.6	84.5	32.7	70.8
Sports medicine and musculoskeletal disorders	63.2	60.2	18.6	62.4
Dermatologic disorders	75.2	81.0	36.3	69.0
Growth and development during puberty and endocrine disorders	85.8	82.7	30.1	69.9
Reproductive health	78.3	64.2	25.2	55.3
Mental health	81.4	68.6	16.8	61.5
Alcohol, smoking, and drug abuse	67.7	58.8	15.9	52.2
Violent risky behaviors	59.7	49.6	10.6	44.2
Accident injury prevention	65.0	59.3	20.4	50.0
Physical abuse and sexual violation prevention	69.5	58.8	19.0	50.9
Family and peer relationship problems	72.1	58.4	23.9	55.8
Ethical, legal, and political aspects	63.2	47.8	11.9	52.2
Communication and interview skills	73.4	63.7	15.0	65.0

Importance: "Is this issue important to adolescent health?" scored from 1 (very unimportant) to 5 (very important).

Necessity: "Is it necessary to provide health services regarding this issue?" scored from 1 (very unnecessary) to 5 (very necessary).

Knowledge: "Do you know about this issue?" scored from 1 (very little) to 5 (very much).

Interest: "Are you interested in receiving further education regarding this issue?" scored from 1 (very uninterested) to 5 (very interested).

knowledge and skills in the management of common and specific adolescent health concerns in practice. Through interdisciplinary cooperation, adolescents can receive more comprehensive care and effective treatment at both the biophysical and psychosocial level.

Among pediatricians, we observed inconsistency between perceived importance, necessity, knowledge, and training needs in a variety of adolescent health issues. Perceived knowledge was generally low in many adolescent health issues, except in obesity, dermatologic, and endocrine diseases. These medical topics are covered in pediatric residency programs, so the pediatricians may have a better understanding of them. On the contrary, other adolescent health issues are scarcely mentioned in current pediatric training. Moreover, the results showed that the perceived importance, necessity, and training needs were higher than perceived knowledge in all adolescent health issues. This finding was compatible with previous studies in the literature [5–7,14,21]. The discrepancy suggests pediatricians' keen interest in continuing medical education in adolescent medicine and emphasizes the urgent need for formal curricula.

We found that the rankings of importance and training needs in miscellaneous adolescent health issues were different from those in studies conducted in Europe and North America [22,23]. European and American adolescent doctors view health issues of psychosocial etiologies as focus areas, which include sexuality, family and school conflict, substance use, sexual and physical abuse, and risky behaviors. In our survey, the leading areas of interest were mainly in medical and mental health. The importance of social and environmental issues was surprisingly less acknowledged, and training needs were also underrated in areas, such as violent risky behaviors and accident injury prevention. This difference in interest may be biased by the enrolled specialists, their prior training, health policies, and their social backgrounds. Accordingly, identifying priorities for development of interest for a wide range of adolescent health issues and recognizing cultural distinctions will provide helpful guidance in designing educational programs more culturally competent to Taiwanese society.

The major limitation of this study was the low response rate, although the demographic distribution of respondents was not different from that of the entire pediatrician population. Unvoiced opinions from nonrespondents may still influence the accuracy of assessment of training needs. Nonrespondents may underrate their training needs in adolescent medicine as the respondents were inclined to be concerned about adolescent health issues and were willing to receive further education. In addition, assessment of knowledge and competence may have been biased by personal perception and could fail to precisely represent respondents' abilities. Reliable correlation between self-rated and actual competence is dependent on self-assessment skills [24]. The scores of perceived competence and knowledge could be overestimated or underestimated from individual to individual. However, understanding respondents' self-assessed competence and interest is more likely to generate goals of learning suitable for their needs [25]. Our results can be seen as a summary of viewpoints returned randomly from registered Taiwanese pediatricians. It is worth emphasizing that 226 pediatricians consistently expressed unmet training interests in adolescent medicine. This finding supports the need for incorporating adolescent health care into pediatric residency training.

In conclusion, this study demonstrated a lack of understanding of and much motivation for training in adolescent medicine from the perspective of pediatricians. These health professionals need to

be well equipped with knowledge and skills to provide comprehensive adolescent health care in practice. There is now an urgent call to integrate these identified health issues of great importance into continued medical education or pediatric residency training to increase pediatricians' insight into adolescent medicine and health.

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