



Barriers to the implementation of new guidelines among pediatric surgeons: online survey

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Abstract

Purpose To identify barriers that prevent pediatric surgeons from implementing updated practice guidelines.

Methods An online survey targeting pediatric surgeons was conducted on the StayCurrent MD Application (SCMA) and Pediatric Surgery Education Facebook page (PSE FBP). The survey results for pediatric surgeons of underdeveloped countries (PSUC) and pediatric surgeons of developed countries (PSDC) was compared and analyzed.

Results Based on the number of active members on PSE FBP and SCA, the response rate was 32.3% (174/539), 66.3% of responses were from PSUC. The majority of PSUC (73%) wanted to have convincing guidelines and the plurality of PSDC (46%) wanted to see approval by the American Pediatric Surgical Association (APSA) for implementation of new guidelines. Lack of resources was the number one response (78%) for PSUC not implementing the most up to date guidelines and about 40% of the PSDC responded “concerned about malpractice liability.”

Conclusions PSUC and PSDC identified very different barriers to implementation of new guidelines. It is reassuring that accessibility to treatment is not the primary issue, though resistance to implementation is a resounding concern. Identifying the barriers will highlight areas that need to be addressed, and awareness may help resolve some of the barriers.

Keywords Barriers · Implementation · Updated · Guidelines · Pediatric surgery

Introduction

As a result of extensive research activities over the last few decades, different medical societies and associations have come up with clinical recommendations to guide the daily practice of health care providers [1]. Implementation of up to date guidelines is a documented issue in medicine. The aim of these guidelines is to help health care providers make the most appropriate therapeutic decisions for a particular condition, based on the most up to date and scientifically founded evidence [1]. However, many previous studies revealed that guidelines are not implemented; more than one-third of patients do not receive the recommended evidence-based management, and up to one-quarter of providers

recommend unnecessary and/or even harmful management [2]. A recent study found that 40% of antibiotic prescriptions were not indicated [3]. Another study concerning the use of antibiotics after appendectomy in children revealed that surgeons prescribe postoperative antibiotics for appendectomy patients in excess to the published recommendations [4]. Implementation of the most up to date guidelines is a multifactorial process influenced by a number of factors, some related to the nature of guidelines, and others to the nature of the environment or setting where the guidelines are supposed to be implemented [5–14]. The financial burdens related to implementing guidelines, the source or the type of studies the guidelines are built on, politics, and team acceptance of the new guidelines are among the reasons that could play a role in this topic [15]. We did not recognize any studies devoted to exploring this issue among pediatric surgeons. We hypothesized that attitudes concerning guidelines may differ by the country classification.

The aim of this study is to survey pediatric surgeons to assess barriers and facilitators of the implementation of updated guidelines. We hypothesized that a significant portion of pediatric surgeons do not implement the most up to

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date guidelines for different reasons and those reasons differ based on the classification status of the country of practice.

Methods

The study is designed to be a cross-sectional survey of pediatric surgeons. The survey link was posted on the PSE FBP and the SCMA over the course of 2 months, from 12/2019 to 01/2020. The survey, “Appendix 1”, assessed attitudes, resources, and systemic barriers encountered that impacted the implementation of new guidelines. Additionally, surgeons were questioned about potential facilitators for the implementation of guidelines. The introductory email included the following: title of the survey, brief description of the survey, and URL link to the survey. The respondents accessed the survey via a link to RedCap (Research Electronic Data Capture). The survey responses were anonymous entries in RedCap. RedCap is a secure, web-based application designed to support data capture for research studies. The University at Buffalo Institutional Review Board approved this study.

A previously validated survey by Cabana [10] assessing resources, system, and attitudinal barriers and potential facilitators was used. A few questions were added to accommodate the pediatric surgery domain. Classification of the countries from developed to developing was adopted from the Human Development Index (HDI), which is a statistical measurement of nations’ level of human development, taking into account the way income is invested in the education and health sectors [16]. HDI uses three key elements: The life expectancy, which reflects the quality of health care system, access to education, which tracks years of schooling of children at school-entry age and mean years of schooling of the adult population, and standard of living, which depends on Gross National Income per capita controlled for the living expenses of the country [16]. The differences between the two groups were analyzed using the Chi-square test with a *p* value for significance of <0.05.

Results

Based on the number of active members on the PSE FBP and SCA, the response rate was 32.3% (174/539).

Characteristics of participants

Of the 174 respondents, 111 (63.8%) worked only in developing countries and 63 (36.2%) their practice was based in developed countries. Among respondents, there was a preponderance of men (123/174, 62%). The plurality of the participants (87/174, 44%) had ≥ 10 years’ experience, and 73%

(122/174) of them work at academic institutions. Table 1 shows participants’ demographics.

Quality of the guidelines

Most pediatric surgeons would like to see a level 1 evidence study (59%), followed by guidelines that are accepted by their team (48%).

Approximately two-thirds of those surveyed agreed that treatment guidelines should be evidence-based, 61% of the providers think treatment guidelines should be useful in daily clinical work and improve the quality of treatment to implement them, more than half (56%) would like to see the treatment guidelines include different aspects of a disease and believe they are a good tool for confirming the diagnosis, starting initial treatment, and managing complications, and 38% want to have guidelines that are convenient with information that is easy to find to implement.

Barriers to the use of treatment guidelines

The survey queries evaluated barriers related to systems, resources, and attitudinal barriers of physicians and patients. As shown in Table 2, the survey revealed that lack of experience with new protocol/procedure (53%) was the strongest impediment to the use of guidelines, followed by the lack of resources (52%). However, when PSUC is isolated, the lack of resources becomes the first barrier (78%) and is significantly different from PSDC, *p* = 0.03. The other barriers included lack of agreement regarding content (48%), lack of awareness (38%), and concerns about malpractice liability (28%).

Table 1 Participants’ demographics

Variables	Overall	Developing 111 (63.8%)	Developed 63 (36.2%)
Gender			
Male	123 (62.1%)	87 (79.1%)	36 (60%)
Female	45 (22.7%)	23 (20.9%)	22 (36.7%)
Would rather not say	2 (1.2%)	0 (0%)	2 (3.3%)
Experience in years			
1–3	30 (15.2%)	20 (18%)	10 (15.9%)
4–6	24 (12.1%)	16 (14.4%)	8 (12.7%)
7–10	33 (16.7%)	20 (18%)	13 (20.6%)
> 10	87 (50%)	55 (49.5%)	32 (50.8%)
Affiliation			
Academic	121 (61.6%)	77 (73.3%)	45 (73.8%)
Private	13 (6.6%)	12 (11.4%)	1 (1.6%)
Community	26 (13.1%)	12 (11.4%)	14 (23%)
Other	5 (2.5%)	4 (3.8%)	1 (1.6%)

Table 2 Attitudes towards treatment guidelines

Survey question (<i>N</i> = number of respondents)	PSUC (111)	PSDC (63)	<i>p</i> value
Treatment guidelines are evidence-based (<i>N</i> =174)	56 (50.5%)	50 (79.4%)	0.00
Treatment guidelines are useful in daily clinical work and improve the quality of treatment (<i>N</i> =174)	56 (50.5%)	47 (74.6%)	0.00
Treatment guidelines include different aspects of a disease, and are a good tool for confirming the diagnosis, starting initial treatment, and managing complications (<i>N</i> =174)	60 (54.1%)	37 (58.7%)	0.55
Treatment guidelines are convenient and the information is easy to find (<i>N</i> =174)	35 (31.5%)	31 (49.2%)	0.02

When the participants were asked which resource barriers impede their implementation of updated guidelines, half of them stated that costs related to the diagnostic workup and/or new therapies are the main obstacles. One-fifth of the participants stated that they had no resource-related obstacles and only 16% had no time to search for information.

The system-related barriers that impeded the implementation of updated guidelines among pediatric surgeons were the issues of accessibility and clarity, for 29% of participants. On the other hand, 54% had no problems with either.

Attitudinal barriers were impediments for 12% because they reduce doctors' autonomy, for 13% due to limiting treatment options, for 37% because they limit flexibility and individual approach, for 4% because there is no need for treatment guidelines as treatment routines exist, and for 29% attitudinal barriers were not a problem.

The vast majority of pediatric surgeons (87%) think that there were no patient barriers impeding the implementation of updated guidelines while only 13% think that patients do not want doctors to conform to treatment guidelines.

Compared to PSDC, PSUC were more likely to experience a number of barriers, including a lack of resources

(diagnostic 70 vs 30% $p=0.32$, therapeutic 82 vs 18%, $p=0.00$, time 32 vs 68%, $p=0.00$, no lack 59 vs 41%, $p=0.30$). Comparison of groups of PSUC and PSDC is shown in Table 3. There were no differences between PSUC and PSDC in terms of accessibility (67 vs 33%, $p=0.95$) and clarity (61 vs 39%, $p=0.36$). None of the patient-related or four attitudinal barriers, reduction of doctors' autonomy, limitation of treatment options, limitation of flexibility and individual approach, and routines previously existing, were different between the two groups, $p>0.05$ (see Table 4).

Compared to PSDC, PSUC found that easy-to-find online guidelines and information that are published through professional societies are effective ways to overcome the implementation barriers. Regarding the other facilitators, both groups were similar.

Facilitators to implement guidelines

There was strong agreement among 70% of respondents that an easy-to-find online database of guidelines would facilitate the use of the guidelines. However, that was significantly different between the two groups, 60% of PSUC and 40% of

Table 3 Perceived barriers to guideline use

Survey question (<i>N</i> = number of respondents)	PSUC (111)	PSDC (63)	<i>p</i> value
Resource barriers			
Treatment guidelines are hard to implement in daily practice due to lack of medical resources (investigational abilities, etc.) (<i>N</i> =174)	54 (48.6%)	27 (42.9%)	0.64
Treatment guidelines are hard to implement in daily practice due to a lack of resources of patients (expensive medicines, etc.) (<i>N</i> =174)	64 (57.7%)	20 (31.7%)	0.00
There is no time to search for information (<i>N</i> =174)	8 (7.2%)	19 (30.2%)	0.00
System barriers			
Treatment guidelines are not accessible (<i>N</i> =174)	30 (27.0%)	18 (28.6%)	0.83
Treatment guidelines are too complicated and it is difficult to find the information (<i>N</i> =174)	28 (25.2%)	23 (36.5%)	0.12
Attitudinal barriers			
Treatment guidelines reduce doctors' autonomy (a 'cookbook') (<i>n</i> =174)	14 (12.6%)	6 (9.5%)	0.54
Treatment guidelines limit treatment options (<i>N</i> =174)	15 (13.5%)	6 (9.5%)	0.44
Treatment guidelines limit flexibility and individual approach (<i>N</i> =174)	37 (33.3%)	24 (38.1%)	0.53
There is no need for treatment guidelines as treatment routines exist (<i>N</i> =174)	2 (1.8%)	4 (6.3%)	0.11
Patient barriers			
Patients do not want doctors to conform to treatment guidelines (<i>N</i> =174)	14 (12.6%)	7 (11.1%)	0.77

Table 4 Perceived facilitators to guideline use

Survey question (<i>N</i> =number of respondents)	PSUC (111)	PSDC (63)	<i>p</i> value
An easy-to-find online database (<i>N</i> =174)	68 (61.3%)	50 (79.4%)	0.01
Special training courses (<i>N</i> =174)	67 (60.4%)	32 (50.8%)	0.22
Published materials (<i>N</i> =174)	57 (51.4%)	40 (63.5%)	0.12
Information through professional societies (<i>N</i> =174)	50 (45.0%)	44 (69.8%)	0.00
Available consultation to answer questions about the guidelines (<i>N</i> =174)	53 (47.7%)	32 (50.8%)	0.70

PSDC, $p=02$. About 58% of respondents agreed that training sessions on how to implement guidelines were very important, but when subcategorized into two groups, PSUC was more appreciative of this facilitating measure, at 72% versus 28% among PSDC.

The average rating importance of the other three facilitators, published materials, available consultation to answer questions about the guidelines and information through professional societies, ranged from 50 to 57%. Nevertheless, the latter was significantly different between the two groups, $p=00$.

Qualitative comments

About 62% of participants provided additional comments, 17% listed resource-related suggestions to implement the guidelines, 12% thought that their team's reluctance to new guidelines is the reason for not implementing the recent recommendation, and 4% mentioned the accessibility of the guidelines as the main barrier. Guidelines that were not clear or not accessible (unawareness) were the barriers in 2% while patients attitude in 1%, training 2%, and reliability 2%.

Importantly, due to a technical glitch, the majority of participants (86%) missed to respond to whether they are using the recent guidelines in their daily practice, and of the respondents only 14% (23) answered the question about implementing guidelines, of which only 13% stated they implement updated guidelines, recommendations and protocols. Worth noting is that this question was an additional question and is not part of the original questionnaire by Cabana [10].

Discussion

This study showed that treatment guidelines that are useful in daily clinical work and can improve the quality of treatment was more favorable by PSUC compared to PSDC. Lack of resources is the number one reason listed among PSUC for not implementing the most up to date guidelines. Guidelines approved by APSA are of the utmost importance for PSDC in terms of implementing the most up to date guidelines. The most effective method of helping overcome

any of the barriers was accessibility, however, that was more important for PSUC versus PSDC.

Determining barriers and facilitators to implementation of the most up to date guidelines is a very crucial step to apply evidence-based medicine that can reduce mortality and morbidity [11]. Similar to our findings, Smith and Brooks reported that the main barriers that prevent physicians from adopting the guidelines are awareness, knowledge, training, environment, patients' status, and liability issues [17]. Another study that included 55 internists in Switzerland found that the main barriers to implementing guidelines were lack of awareness and familiarity, the convenience of current guidelines, unconvincing new guidelines, lack of time, and systemic obstacles [18].

An observational study explored the use of 47 different recommendations from 10 national clinical guidelines in the Netherlands and included 61 general practitioners [19]. Contrary to our finding, it found recommendations were implemented in 61% of the decisions [19]. However, the other findings were consistent with ours where clear recommendations had a higher chance to be applied and recommendations that required systemic change in current routines were less likely to be implemented compared to those that did not require any changes [19]. The study also revealed that evidence-based guidelines had higher implementation rates compared with those that were not underpinned by a strong scientific foundation, which corresponds with our conclusion [19].

Without a doubt, there is a wide gap between the availability of resources among developed and developing countries [20], which can have a dramatic impact on implementing the updated guidelines that may require using new technology. Moreover, the classification of the countries into developed and underdeveloped (developing) countries reflects both the scientific and economic status of the nations, which have the main impact on the health care system in terms of awareness, source availability, health insurance and malpractice laws. We think this categorization has the most powerful impact on the participants' response where previous studies showed that health care systems/services between developing and developed can be significantly different. An important finding of this study was the impact of the resources on implementing the guidelines between

PSUC and PSDC. Lack of resources has been documented previously in many studies as a cause of higher mortality and morbidity in limited-resource settings. For example, the mortality rate of gastroschisis patients is about eight-times higher in Jamaica compared to the USA due to lack of supportive measures [21].

Lack of awareness of the new guidelines was another barrier identified by many pediatric surgeons. This can be related to the limited resources where access to most medical journals and attendance at scientific conferences can be a financial struggle to PSUC [22]. However, even in developed countries the lack of awareness can be a real problem. A study that included 300 American pediatricians found that 50% of pediatricians were not aware of the Agency for Health Care Policy and Research (AHCPR) otitis media guidelines, and 84% were unaware of the US Preventive Services Task Force (USPSTF) Guide to Clinical Preventive Services [23].

Apprehension of liability and legal concerns were also behind not implementing the new guidelines, especially among PSDC. There is a potential risk of liability for the guidelines implementers, for a number of reasons including perceived unreasonable recommendation or sometimes harmful course of action by the guidelines [24]. On the other hand, not implementing the guidelines might be the reason for using health care providers [25].

The limitations of this study included its relatively small sample size where social media is not the most favorite platform for many pediatric surgeons. Thus, the generalizability of the results of this study is questionable. A response rate of 31% makes selection bias a possibility. The potential reasons for this response rate may include that some pediatric surgeons may not check Facebook or the SCMA very often, lack of time, interest or appetite to fill the surveys. It is important to note that pediatric surgeons who are active on social media are the most likely to be aware of the new guidelines and might have more positive attitudes compared to the ones who are not on social media or decided not to participate. Additionally, as answers are based on self-reporting, over-reporting and adherence to guidelines, bias can be expected, especially with a very quick response rate for the implementing question. Although, this study used evaluation questions that have been used by multiple previous studies to assess attitudes and barriers, an extensive/comprehensive validation of this questionnaire has not been carried out. Another potential bias is the peer influence of especially the senior pediatric surgeons (> 10 years of experience) which can be a challenge toward applying the new recommendations, as it has been stated by a number of participants. It is worth noting that this survey was conducted on the English language-based platforms, specifically targeting PSE FBP and SCMA. Second, the vast majority of the health care providers around the world speak English because most of the medical school

materials and postgraduate literature are available in English. Nonetheless, we think the language barrier can be a potential bias in this survey, and subsequent studies will add a translate option to the survey.

Despite the above-mentioned limitations, there are a number of strengths of this study. To our knowledge, this is the first survey on pediatric surgeons who were questioned about their awareness, utility, attitudes and barriers to implementing the updated guidelines. The assessment of attitudes and barriers was conducted based on a validated framework and a previously constructed questionnaire [6, 10]. This topic has not been previously explored for pediatric surgery and has also not been examined on an international level. The combination of pediatric surgeons from developing and developed countries can shed light on what experiences are unique because of the economic status of nations and what are shared by all pediatric surgeons across the globe. The goal of subsequent studies might be to identify ways to overcome those barriers. The hope is that the findings that will instigate or spark interest for others to ask these types of questions. The future plan is to conduct a detailed survey that can reveal the exact reason and facilitator of implementing the guidelines.

Author contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by AL, AG, SW, and TP. The first draft of the manuscript was written by AL and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest First author, Abdullaouf Lamoshi, declares that he has no conflict of interest. Second author, Alexander Gibbons, declares that he has no conflict of interest. Third author, Sonja Williams, declares that she has no conflict of interest. Senior author, Todd Ponsky, declares that he has no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Human and animal rights This article does not contain any studies with animals performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the study (survey).

Appendix 1

Barriers to the implementation of new guidelines among pediatric surgeons questionnaire

1. How many years of experience do you have as a pediatric surgeon?
 1. 1–3.
 2. 4–6.
 3. 7–10.
 4. > 10.

2. What is your gender?
 1. Male.
 2. Female.
 3. I would rather not say.

1. What is your country of practice?

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3. Hospital affiliation?
 1. Academic.
 2. Private.
 3. Community.
4. How do you keep up to date with changing guidelines, recommendations and protocols? (Check all that apply).
 1. Reading journals regularly.
 2. Attending national meetings.
 3. Institutional weekly academic conferences.
 4. Other.
 5. None of the above.

5. What evidence would like to see to adopt and implement? (Check all that apply).
 1. Level 1 evidence study.
 2. Published by APSA.
 3. Accepted by your team.
 4. Convincing/appealing for you.

6. Do you implement the most update guidelines, recommendations, and protocols in your daily practice?
 1. Yes.
 2. No.
 3. Somewhat.

7. If No or somewhat, what is/are the reasons? (Check all that apply).
 1. Lack of resources.
 2. Lack of awareness.
 3. Lack of agreement regarding content.
 4. Concerns about malpractice liability.
 5. Lack of experience with the new protocol/procedure.

8. Can you think of any other barriers that would prevent you from implementing the most up to date guidelines, protocols, or recommendations?

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9. Which of the following resource barriers stops you from implementing the updated guidelines?
 1. Treatment guidelines are hard to implement in daily practice due to lack of medical resources (investigational abilities, etc.)
 2. Treatment guidelines are hard to implement in daily practice due to a lack of resources of patients (expensive medicines, etc.)
 3. There is no time to search for information
 4. None.

10. Which of the following system barriers stops you from implementing the updated guidelines?
 1. Treatment guidelines are not accessible.
 2. Treatment guidelines are too complicated and it is difficult to find the information
 3. None

11. Which of the following attitudinal barriers stops you from implementing the updated guidelines?
 1. Treatment guidelines reduce doctors' autonomy (a 'cookbook')
 2. Treatment guidelines limit treatment options
 3. Treatment guidelines limit flexibility and individual approach
 4. There is no need for treatment guidelines as treatment routines exist
 5. None

12. Which of the following patient barriers stops you from implementing the updated guidelines?
 1. Patients do not want doctors to conform to treatment guidelines
 2. None

13. What can help you overcome the barriers?
 1. An easy-to-find online database
 2. Special training courses
 3. Published materials

4. Information through professional societies
5. Available consultation to answer questions about the guidelines

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