



## Practice Management

## Barriers and facilitators to the implementation of evidence-based practice by pediatric surgeons

Katrina J. Sullivan<sup>a</sup>, Carolyn Wayne<sup>a</sup>, Andrea M. Patey<sup>b,c</sup>, Ahmed Nasr<sup>a,d,\*</sup><sup>a</sup> Department of Pediatric Surgery, Children's Hospital of Eastern Ontario, 401 Smyth Road, Ottawa, ON, Canada, K1H 8L1<sup>b</sup> City, University of London, Northampton Square, London, United Kingdom, EC1V 0HB<sup>c</sup> The Ottawa Hospital Research Institute, 501 Smyth Road, Ottawa, ON, Canada, K1H 8L6<sup>d</sup> Faculty of Medicine, University of Ottawa, 451 Smyth Road, Ottawa, ON, Canada, K1H 8M5

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## ABSTRACT

**Background/Purpose:** Evidence-based practice (EBP) has been identified as a foundation of mainstream medical practice, yet pediatric surgery has been slow in the acceptance and implementation of EBP.

**Methods:** Semi-structured interviews of 14 pediatric surgeons were conducted to determine barriers and facilitators to EBP. Resulting data were analyzed using a systematic 3-step approach of coding, generation of specific beliefs, and identification of domains relevant to practice change.

**Results:** Six domains were identified as relevant to changing pediatric surgeons' use of evidence in practice: environmental context and resources, goals, knowledge, skills, social influence, and social/professional role and identity. Important barriers to EBP implementation included time constraints and resource limitations, the general poor quality of evidence in pediatric surgery, a lack of required skills, and a culture that continues to rely on an apprenticeship style of teaching. Facilitators include working in a research hospital, and having a local champion/peers that support EBP implementation. There were conflicting thoughts as to whether working as a group facilitated or impeded EBP.

**Conclusions:** Pediatric surgeons' use of research evidence in practice is influenced by a number of domains. These results may be used to inform the design of behavior change interventions intended to encourage EBP implementation.

**Levels of evidence:** Level V.

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Evidence-based practice (EBP) is the integration of best research evidence with clinical expertise and patient values in the decision-making process for patient care [1]. While EBP is recognized as a foundation of mainstream medical practice [2], surgical practice has been slow in its acceptance and implementation when compared to its medical counterpart, with pediatric surgery even further behind adult surgery in the pursuit of EBP [2].

There have been many suggestions as to why pediatric surgery is slow to adopt research evidence into practice. A commonly cited reason is the overall lack of high-quality evidence in the field [2,3], with randomized controlled trials (RCTs) comprising only 0.04% of all studies published within 26 journals that had published at least one pediatric surgical RCT between January 1999 and December 2009 [2]. Implementation of evidence-based practice may also be hindered by the

traditional apprenticeship style of teaching utilized in surgical education, as surgeons may find it difficult to no longer adhere to the principles taught to them during their training [2]. Further to this, resistance may result from comfort in current practice habits, or a stronger belief in their own clinical perceptions than research evidence.

While previously published literature has tended to focus on “resource”-dependent barriers (e.g. lack of quality evidence) there currently exists a knowledge gap in how more complex factors of behavior change influence EBP implementation. Additionally, to the best of our knowledge, no previously conducted study actually asked pediatric surgeons about their beliefs and behaviors concerning EBP. In response to this knowledge gap, we used the Theoretical Domains Framework [4] (TDF) to systematically determine pediatric surgeon-identified barriers and facilitators to the utilization of research evidence in their practice.

## 1. Methods

## 1.1. Design

For this qualitative interview study we conducted semi-structured interviews of pediatric surgeons specializing in general surgery.

**Abbreviations:** EBP, Evidence-based practice; RCT, Randomized controlled trial; TDF, Theoretical Domains Framework; CAPS, Canadian Association of Pediatric Surgeons.

\* Corresponding author at: Children's Hospital of Eastern Ontario, Department of Pediatric Surgery, 401 Smyth Road, Ottawa, Ontario, Canada, K1H 8L1. Tel.: +1 613 737 7600x3748; fax: +1 613 738 4849.

E-mail addresses: [ksullivan@cheo.on.ca](mailto:ksullivan@cheo.on.ca) (K.J. Sullivan), [cwayne@cheo.on.ca](mailto:cwayne@cheo.on.ca) (C. Wayne), [apatey@ohri.ca](mailto:apatey@ohri.ca) (A.M. Patey), [anasr@cheo.on.ca](mailto:anasr@cheo.on.ca) (A. Nasr).

## 1.2. Ethics

Ethical approval was obtained from the Children's Hospital of Eastern Ontario Research Ethics Board.

## 1.3. Participants

We used convenience sampling to recruit English speaking pediatric surgeons attending the 47th annual Canadian Association of Pediatric Surgeons (CAPS) conference in Niagara Falls, Ontario, Canada. This method of sampling was chosen as all pediatric surgeons specializing in general surgery in Canada are members of CAPS (~80 members), and membership is further extended to international practitioners (~200 members). Additionally, pediatric surgeons who are not members of CAPS are invited to attend the conference. As such it was estimated that up to 350 pediatric surgeons representing a diverse sample would be in attendance. There were no restrictions based on country of origin, years of practice, age, or gender.

## 1.4. Sample size

To determine an adequate sample size, we used the principles for deciding saturation in theory-based interview studies proposed by Francis et al. (2010) [5]. The first principle requires a priori specification of the sample size for the first round of analysis, as informed by the complexity of the research question, the interview topic, the diversity of the sample, and the nature of the analysis. This number is the basis for progressive judgments about data saturation. The research team agreed upon an initial analysis sample number of 10 interviews. The second principle requires a priori specification of how many additional interviews will have to be conducted where no new themes or ideas emerge before it can be concluded that data saturation has been reached. We decided on a stopping criterion of three further interviews. Therefore, we determined the need for at least 13 interviews.

## 1.5. Recruitment

Previous TDF-based interview studies of medical practitioners exhibited low recruitment rates, including a 25% physician recruitment rate by Curran et al. (2013) [6] and a 3.9% recruitment rate of trainee doctors (within the first two years of postgraduate training) by Duncan et al. (2012) [7]. As such, all pediatric surgeons attending the CAPS conference were contacted via email and were invited for an in-person interview to occur during the CAPS conference at a time convenient to them. Pediatric surgeons willing to participate were asked to respond with their gender, year of birth, number of years practicing pediatric surgery, surgical specialty, and current city/country of residence to try to ensure the recruitment of a diverse population.

## 1.6. Interview guide

The TDF is a framework that examines psychological factors of behavior change through 84 theoretical constructs in 14 different domains: 1) knowledge, 2) skills, 3) social/professional role and identity, 4) beliefs about capabilities, 5) optimism, 6) beliefs about consequences, 7) reinforcement, 8) intentions, 9) goals, 10) memory, attention, and decision processes, 11) environmental context, 12) social influences, 13) emotion, and 14) behavioral regulation [4]. Previously published TDF interview guides were utilized to inform the design of our own guide [8,9], and a health psychologist (AMP) reviewed the questions to verify their appropriateness for each domain. The final guide addressed all 14 domains of the TDF, with two to three questions developed for each domain to cover a range of constructs (please see Appendix A for interview guide).

## 1.7. Procedure

A pilot interview was conducted with a pediatric surgeon to determine if any changes were required to improve comprehension and understanding, to ensure a mean interview time of approximately 30–45 min, and to determine if there were any TDF domains that were not being adequately addressed. Following finalization of the interview guide, participating pediatric surgeons were interviewed in person at the 47th annual CAPS conference, occurring September 17–19, 2015 in Niagara Falls, Ontario. All interviews were digitally recorded, and recordings were transcribed and anonymised.

## 1.8. Analysis

Theory-based content analysis occurred in three stages: coding, generation of specific beliefs, and identification of relevant domains. Two researchers (KJS and CW) independently coded the participant responses into the 14 domains of the TDF using a directional approach to content analysis [10] and QSR International's NVivo 10 software [11]. KJS had previous training and experience in TDF coding (including a one-day workshop led by the developers of the TDF and several previous publications using the TDF), and subsequently trained CW in the methodology (who also had access to workshop materials: [https://kcanada.ohri.ca/workshop\\_tdf/](https://kcanada.ohri.ca/workshop_tdf/)). Two pilot interviews were coded initially; the first interview was coded in tandem to develop the coding strategy while the second was coded independently to ensure comfort with the strategy developed. Once all interviews had been coded, Cohen's Kappa was calculated for all interviews and TDF domains to assess the reliability of agreement between the two researchers [12,13]. Disagreements between researchers in coding were discussed, and when consensus could not be reached the interview response was coded in all domains identified by the researchers.

Belief statements were then generated by one researcher (KJS) and verified by a second (CW). A belief statement is a generalized statement that expresses the underlying theme of responses during an interview that suggests a problem and/or influence on the target behavior [14]. Belief statements were worded to be applicable to multiple utterances by interview participants, and therefore similar statements were identified as two instances of the same belief. Additionally, belief statements on the same continuum (e.g. centered on the same theme or polar opposites of a theme) were grouped together.

Relevant domains were identified by the two researchers (KJS and CW) and were verified by a health psychologist (AMP). A domain was identified as "relevant" if there was: a) a relatively high frequency of several specific beliefs, b) conflicting beliefs, and/or c) evidence of strong beliefs that may impact the behavior [15].

## 2. Results

### 2.1. Participants

A total of 14 pediatric surgeons were interviewed regarding their beliefs and behaviors concerning EBP implementation. Participants were from Canada ( $n = 9$ , 64%), the United States ( $n = 3$ , 21%), or Australia ( $n = 2$ , 14%) and the majority were male ( $n = 12$ , 86%). Interviewed surgeons ranged in age from 40 to 74 (median 56.5 years) and practiced for an average of  $20.9 \pm 9.4$  years (range 8–32).

### 2.2. Interrater reliability

A total of 818 utterances from 14 interviews were coded into the 14 domains of the TDF. Interrater reliability ranged from  $\kappa = 0.3738$  to  $\kappa = 0.6975$  (mean  $\pm$  SD:  $0.5538 \pm 0.0880$ ) for each interview when unweighted, and  $\kappa = 0.3643$  to  $\kappa = 0.6639$  (mean  $\pm$  SD:  $0.5638 \pm 0.0916$ ) for each interview when weighted by source size. Therefore the majority of interviews were assessed as having "moderate" or

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