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INTERVENÇÕES EDUCATIVAS PARA CRIANÇAS, ADOLESCENTES E PAIS NO PERÍODO PERIOPERATÓRIO

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Saúde Infantil e Pediátrica

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DISSERTAÇÃO DE MESTRADO

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EDUCATIONAL INTERVENTIONS FOR CHILDREN, ADOLESCENTS AND PARENTS IN THE PERIOPERATIVE PERIOD: A SYSTEMATIC REVIEW

Dissertação de Mestrado orientada pela Professora Doutora Margarida Reis Santos e coorientada pela Mestre Márcia Pestana-Santos

Inês Martins Esteves

Porto, 2021

Segue o teu destino,
Rega as tuas plantas,
Ama as tuas rosas.
O resto é a sombra
De árvores alheias.

A realidade
Sempre é mais ou menos
Do que nós queremos.
Só nós somos sempre
Iguais a nós-próprios.

Suave é viver só.
Grande e nobre é sempre
Viver simplesmente.
Deixa a dor nas aras
Como ex-voto aos deuses.

Vê de longe a vida.
Nunca a interrogues.
Ela nada pode
Dizer-te. A resposta
Está além dos deuses.

Mas serenamente
Imita o Olimpo
No teu coração.
Os deuses são deuses
Porque não se pensam.

Fernando Pessoa (1916)

Aos meus pais, o meu *Amor Maior*.

Dirijo o meu sincero agradecimento:

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A todos endereço um enorme *obrigada!*

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RESUMO

Introdução: A cirurgia pediátrica é um evento potencialmente stressante e traumático para a criança e sua família. As intervenções educativas, através de uma abordagem centrada na família, podem servir de recurso aos enfermeiros na gestão da ansiedade perioperatória, dor e ajudar a melhorar as atitudes e comportamentos de pais, crianças e adolescentes submetidos a cirurgia.

Objetivo: Avaliar a efetividade das intervenções educativas na dor, ansiedade e comportamentos de crianças/adolescentes (3-19 anos) e na ansiedade dos seus pais, no período perioperatório.

Métodos: O estudo seguiu a metodologia do Instituto Joanna Briggs para revisões sistemáticas de efetividade. O protocolo foi elaborado e registado na PROSPERO. Consideraram-se estudos em que foram realizadas intervenções educativas a crianças e adolescentes dos três aos 19 anos, submetidos a cirurgia eletiva, e aos seus pais e cujos resultados se focassem na dor, ansiedade e comportamentos em crianças e adolescentes e ansiedade nos pais. Foram incluídos estudos, publicados e não publicados, entre janeiro de 2007 e abril de 2021, disponíveis em inglês, espanhol e português, pesquisados nas bases de dados MEDLINE, CINAHL, PsycINFO, Cochrane *Central Register of Controlled Trials* e SciELO; para estudos não publicados OpenGrey, *Open Access Theses and Dissertations* e RCAAP – Portugal. Os estudos foram avaliados de forma independente por dois revisores.

Resultados: Foram incluídos 28 estudos (dois quasi-experimentais e 26 estudos randomizados controlados) de um total de 4500 registos identificados. As intervenções educativas centradas na família incidiram em explicações sobre os cuidados perioperatórios, estratégias para facilitar o contacto da criança com o ambiente cirúrgico e fornecer aos pais informação sobre equipamentos e procedimentos, e utilizaram *DVDs*, vídeos, jogos, panfletos, livros, visitas guiadas e o brincar terapêutico. Os dados da meta-análise revelaram que as crianças e adolescentes beneficiam das intervenções educativas na gestão da ansiedade perioperatória ($SMD_{pré\text{-}operatória}$=−1,02; SE=0,36; 95% CI [−1,73;−0,32]), demonstraram melhor *compliance* durante a indução anestésica (SMD=−1,40; SE=0,67; 95% CI [−2,72;−0,09]) e níveis de dor pós-operatória mais reduzidos (SMD=−0,43; SE=0,33; 95% CI [−1,05;−0,19]). Não foi encontrada evidência relativamente à efetividade das intervenções educativas nos comportamentos negativos pós-operatórios, como distúrbios do sono, da alimentação ou emocionais (SMD=0,12; SE=0,15; 95% CI [−0,84; 1,09]). As intervenções educativas também foram efetivas na redução da ansiedade pré-operatória dos pais (SMD=−0,94; SE=1,00; 95% CI [−2,87;−0,99]).

Conclusões: As intervenções educativas centradas na família devem ser consideradas na gestão da ansiedade e dor das crianças e adolescentes e na ansiedade dos pais durante o período perioperatório.

Palavras-chave: ansiedade; criança; educação; dor; cuidados centrados na família.

ABSTRACT

Introduction: Paediatric surgery is a potentially stressful and traumatic event for the child and family. Through a family-centred approach, educational interventions can serve as a resource for nurses in the management of perioperative anxiety, pain, and behaviours of parents, children and adolescents undergoing surgery.

Objective: Evaluate the effectiveness of family-centred educational interventions in the anxiety, pain and behaviours of children/adolescents (3-19 years old) and their parents' anxiety in the perioperative period.

Methods: This review followed the Joanna Briggs Institute methodology for systematic reviews of effectiveness. The protocol was developed and registered in PROSPERO. This review considered studies in which the educational interventions were carried out to children and adolescents between three and 19 years who underwent elective surgery, and their parents, and whose results focused on pain, anxiety and behaviours in children/adolescents and anxiety in parents. The databases MEDLINE, CINAHL, PsycINFO, Cochrane Central Register of Controlled Trials, and SciELO and Sources of unpublished studies OpenGrey, Open Access Theses and Dissertations, and RCAAP – Portugal were searched systematically to find both published and unpublished studies from January 2007 to April 2021 available in English, Spanish and Portuguese. Two reviewers independently assessed the studies.

Results: Twenty-eight studies (two quasi-experimental studies and 26 randomized controlled trials) were included from a total of 4500 records identified. Family-centred educational interventions focused on explanations about perioperative care, strategies to facilitate children's adaptation to the operating room, and provide parents with knowledge about equipment and procedures; DVDs, videos, games, booklets, leaflets, face-to-face teaching, tour visits and therapeutic play were used among the studies. Data from meta-analysis revealed that children and adolescents benefited from educational interventions in managing perioperative anxiety ($SMD_{preoperative}$=−1.02; SE=0.36; 95% CI [−1.73;−0.32]), demonstrating better compliance at induction of anaesthesia (SMD=−1.40; SE=0.67; 95% CI [−2.72;−0.09]) and reduced pain intensity postoperatively (SMD=−0.43; SE=0.33; 95% CI [−1.05;−0.19]). No evidence was found regarding the effectiveness of educational interventions on postoperative maladaptive behaviours, such as sleep disturbances, eating or emotional disorders (SMD=0.12; SE=0.15; 95% CI [−0.84; 1.09]). Educational interventions were also effective in reducing parental preoperative anxiety (SMD=−0.94; SE=1.00; 95% CI [−2.87;−0.99]).

Conclusions: Family-centred educational interventions must be considered in the management of anxiety and pain of children and adolescents and parental anxiety in the perioperative period.

Keywords: anxiety; child; education; pain; family-centred care.

LISTA DE SIGLAS E ABREVIATURAS

| Siglas

CCF	Cuidados Centrados na Família
ESEP	Escola Superior de Enfermagem do Porto
EUA	Estados Unidos da América
JBI	The Joanna Briggs Institute
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analysis
PROSPERO	International Prospective Register of Systematic Reviews
RSL	Revisão Sistemática da Literatura
SMD	*Standardised mean difference*

| Abreviaturas

Edição	ed.
Editores	Ed. (Eds.)
***Et alli* (e outros)**	et al.
Exemplo	i.e.
***Ibidem* (na mesma obra)**	ibid.
Página	p.
Páginas	pp.
Sem data	s.d.
Volume	Vol.

SUMÁRIO

INTRODUÇÃO

Anualmente, milhões de crianças e adolescentes são submetidos a procedimentos cirúrgicos e estima-se que 50 a 75% experienciam medo e ansiedade durante o período pré-operatório (Astuto & Ingelmo, 2016; Perry, Hooper, & Masiongale, 2012) e dor pós-operatória significativa (Kaminsky et al., 2019). Em Portugal, das 970.000 cirurgias realizadas em 2018, 17.482 foram em idade pediátrica, até aos 14 anos (Instituto Nacional de Estatística, 2020).

A cirurgia em idade pediátrica é um evento potencialmente stressante e ameaçador, podendo constituir uma experiência traumatizante não só para a criança e adolescente, como também para a sua família (Bogusaite, Razlevice, Lukosiene, & Macas, 2018; Li, Lopez, & Lee, 2007). A criança e o adolescente, além de terem necessidades físicas, psicológicas e emocionais diferenciadoras dos adultos (Lee et al., 2013), são particularmente vulneráveis ao stresse e ansiedade que envolvem a cirurgia pelo seu desenvolvimento cognitivo, experiência e conhecimento que possuem sobre os cuidados de saúde (Al-Sagarat, Al-Oran, Obeidat, Hamlan, & Moxham, 2017).

Nas últimas décadas, o avanço no desenvolvimento das técnicas cirúrgicas, agentes anestésicos e conhecimento em enfermagem pediátrica permitiram que muitos dos procedimentos cirúrgicos sejam, atualmente, realizados em regime de ambulatório, deixando as crianças e adolescentes mais vulneráveis ao stresse envolvente e com menos tempo para se adaptar ao processo perioperatório (Capurso & Ragni, 2016). Estudos recentes têm apontado a crescente demanda por mais informação pré-operatória por parte das crianças/adolescentes e seus pais (Bogusaite et al., 2018) e para a importância de uma preparação pré-operatória adequada na prevenção de traumas psicológicos futuros (Wakimizu, Kamagata, Kuwabara, & Kamibeppy, 2009).

Evolução da infância, adolescência e Cuidados Centrados na Família no contexto perioperatório

Até ao século XIX, havia a generalização de que a criança era um "adulto em miniatura" (Cabral, Neri, & Santos, 2018), apenas com dissemelhanças no tamanho e na força (Ariès, 1981, cit. in Gebert, 2019; Jácome, 2018). Só com o desenvolvimento de diversos estudos sobre a infância e a reorganização social, particularmente nos séculos XIX e XX, é que a infância passou ser reconhecida como um período específico do desenvolvimento, com características próprias e distintas do adulto (Menezes, 2016; Viana, 2018). Já a diferenciação entre infância e adolescência surge apenas no século XX, com redefinições profundas das diferentes etapas do ciclo vital, em resultado das modificações da sociedade (Ribeiro, 2011). Até então, entendia-se que a criança passava diretamente para a idade

adulta, sem ter de transitar por um estádio intermédio, com características diferenciadoras dos demais (Mendonça, 2007).

Estes conceitos não são estanques, nem tão pouco universais, e vão sofrendo paulatinas variações em resultado das constantes transformações sociais, culturais e geográficas (Kramer & Leite, 1996; Sawyer, Azzopardi, Wickremarathne, & Patton, 2018; Viana, 2018). Atualmente considera-se que a criança é um ator social, pois tem um papel ativo no seu processo de socialização e, por meio das interações sociais, significa e interpreta o mundo que a rodeia (Sarmento, 2004). A criança é também um ser histórico-cultural, que ocupa um espaço que não é só geográfico e cujo desenvolvimento é condicionado por fatores político-económicos que atuam diretamente sobre ela (Kramer & Leite, 1996; Maia, 2012).

A história da cirurgia pediátrica, é também recente, e remonta ao início do século XX (Ziegler, Azizkhan, Allmen, & Weber, 2014). À semelhança da visão que outrora existia acerca da criança, os cuidados perioperatórios pediátricos constituíam uma réplica fiel dos cuidados prestados aos adultos, não existindo qualquer diferenciação entre eles (Dabbagh, Conte, & Lubin, 2017). Todas as intervenções e tratamentos utilizados eram baseados em modelos para adultos (Dabbagh et al., 2017). Do mesmo modo, acreditava-se que as crianças hospitalizadas não deveriam receber visitas dos pais, pois invalidavam a prestação de cuidados de saúde efetivos e eram um fator de stresse aquando do fim da visita (Jolley & Shields, 2009; Shields et al., 2012). À medida que os estudos científicos foram avançando, começou-se a observar que crianças que não dispunham de quaisquer visitas familiares, eram as mais propensas a sofrer trauma emocional, que futuramente teria sérias repercussões psicológicas não só na adolescência, como na idade adulta (Pearson, 1941; Bowlby, 1944, cit. in Jolley & Shields, 2009; Shields et al., 2012). Constatou-se ainda que não existia correlação entre a presença dos pais e o risco de infeção (Jolley & Shields, 2009). Estes estudos foram a alavanca necessária para que profissionais de saúde reconhecessem a importância da família, a necessidade de educar os pais e fazer deles parte integrante e fundamental nos cuidados prestados (Shields, 2016; Shields et al., 2012).

Um conjunto de filosofias de cuidar surgem no sentido de dar resposta a esta necessidade. Shelton e colaboradores (1987) terão sido os grandes impulsionadores e influenciadores do desenvolvimento dos primeiros Cuidados Centrados na Família (CCF) na área pediátrica, que preconizam os seguintes elementos:

- *Reconhecer a família como uma constante na vida da criança;*
- *Facilitar a colaboração entre pais e profissionais de saúde em todos os níveis de cuidados de saúde;*
- *Honrar a diversidade racial, étnica, cultural e socioeconómica das famílias;*
- *Reconhecer os pontos fortes e individualidade da família e respeitar os diferentes métodos de coping;*
- *Partilhar informações completas e imparciais com as famílias de forma continuada;*
- *Encorajar e facilitar o apoio e interação/troca de informação de família para família;*

- *Responder às necessidades desenvolvimentais da criança e da família como parte das políticas de saúde;*
- *Adotar políticas e práticas que proporcionem às famílias suporte emocional e financeiro;*
- *Projetar cuidados de saúde que sejam flexíveis, culturalmente compententes e recetivos às necessidades familiares* (Shields et al., 2012, p.3).

Ao longo do tempo, diversos modelos foram desenvolvidos: a "Participação Parental", em que os pais/familiares estão diretamente envolvidos na realização de cuidados à criança hospitalizada (Darbyshire, 1995, cit. in Jolley & Shields, 2009); "Cuidados pelos Pais", em que os pais e os seus filhos doentes eram colocados numa unidade, construída para o efeito, semelhante a uma casa (Goodband & Jennings, 1992, cit. in Jolley & Shields, 2009) e "Parceria de Cuidados", em que pais e enfermeiros trabalhavam em parceria nos cuidados à criança (Casey, 1995, cit. in Jolley & Shields, 2009). O modelo de Cuidados Centrados na Família, que conhecemos atualmente, surge quase de forma espontânea, em resultado do que já tinha sido desenvolvido nos modelos percursores. É uma abordagem que envolve a participação ou parceria entre crianças/adolescentes, pais/família, profissionais de saúde e hospitais, e é orientada para o planeamento e prestação de cuidados de saúde (Shields et al., 2012). Esta filosofia de cuidados permite uma melhor integração dos cuidados de saúde, melhora os resultados do cliente e tem sido amplamente adotada em contexto pediátrico (Chorney & Kain, 2010). Além disso, reconhece a diversidade de estruturas e dinâmicas familiares, suporte familiar, recursos e necessidades de informação (Hockenberry, Wilson, & Rodgers, 2019).

No início do século XXI, começaram a surgir os resultados dos primeiros estudos sobre a adoção desta filosofia, revelando que tinha implicações claras para o cuidado perioperatório (Chorney & Kain, 2010) e particular relevância para a criança/adolescente submetido a cirurgia eletiva (Chambers, Walmsley & Neill, 2007). No entanto, o primeiro modelo sustentado na filosofia de cuidados centrados na família voltados para a área perioperatória pediátrica, em particular para a adolescência surgiu apenas em 2010, com Chorney e Kain (Chorney & Kain, 2010).

Importância da preparação cirúrgica adaptada ao desenvolvimento da criança/adolescente e centrada na família

Os programas de preparação pré-cirúrgica centrados na família como um todo têm implicações nos resultados pós-operatórios, nomeadamente na ansiedade, quer das crianças, quer dos pais; na incidência de delírio e do consumo de analgésicos no período pós-operatório em crianças; e no encurtamento do tempo até à alta (Fernandes, Arriaga, & Esteves, 2014; Kain et al., 2009; Kain et al., 2007). Alguns estudos revelaram ainda benefício

na aquisição de conhecimento, satisfação, atitudes e comportamentos dos pais na gestão da dor pós-operatória dos seus filhos (Chartrand, Tourigny, & Maccormick, 2017; He, Zhu, Chan, Xiao, et al., 2015; He, Zhu, Chan, Liam, et al., 2015).

As intervenções de preparação pré-cirúrgica devem ser, tanto quanto possível, dirigidas e adaptadas à criança/adolescente, mas também devem envolver a família/pais, no sentido de minimizar a sua ansiedade, sensação de perda de controlo e promover uma recuperação mais rápida da criança/adolescente (Dionigi, Sangiorgi, & Flangini, 2014; Perry et al., 2012; Shields et al., 2012). Os pais são aqueles que melhor conhecem a criança e por isso, devem ser encorajados a ter uma participação ativa nos cuidados perioperatórios (Chartrand et al., 2017; Marques et al., 2011).

De forma a perceber como é que o evento cirúrgico pode afetar a criança e o adolescente e os fatores que contribuem para uma experiência mais ou menos positiva, torna-se importante explorar conceitos e enquadrar a criança/adolescente, tendo em consideração o seu desenvolvimento cognitivo e psicossocial. Dependendo dos diferentes estágios do desenvolvimento em que a criança se encontra, tem-se recém-nascido (0-28 dias); lactente (29 dias a 12 meses), *toddler* (12 a 36 meses), criança em idade pré-escolar (36 meses a 5 anos) e criança em idade escolar (6 a 12 anos) (Hockenberry et al., 2019). A adolescência é definida como o período do desenvolvimento entre a infância e a adultez, dos 10 aos 19 anos de idade (World Health Organization, 2017, 2020). De acordo com as características do desenvolvimento, a adolescência pode ser dividida em adolescência inicial (10-14 anos), adolescência média (15-16 anos) e adolescência tardia (17-19 anos) (Barrett, 1996; Pestana-Santos, Reis Santos, Cardoso, & Lomba, 2019).

Os limites inferiores e superiores de idade cronológica para cada um destes estágios do desenvolvimento, quer da criança, quer do adolescente, variam de autor para autor, pelo que não devem ser um fator delimitador da definição dos diferentes períodos de vida (Gebert, 2019). Por essa razão, um indivíduo com 16 anos pode ser considerado criança, adolescente e/ou jovem, apesar de todos estes conceitos transparecerem significados diferenciadores O termo ‘criança’ sugere dependência, enquanto ‘jovem’, sinais de independência; e ‘adolescente’, indivíduo em crescimento que é capaz de responder a um aumento de responsabilidade, mas que, no entanto, precisa de maior proteção que um adulto (Sawyer et al., 2018). Fatores como o aumento do número de anos de escolarização obrigatória fazem com que o adolescente dependa da família por um período de tempo maior (Sawyer et al., 2018).

Além do hiato existente na divulgação científica de dados relativos ao número de cirurgias pediátricas na Europa, constata-se uma heterogeneidade e compartimentação do conceito e limites etários de criança e adolescente (Parigi, Czauderna, Rolle, & Zachariou, 2017; Tillig, Ehrich, & Rolle, 2018). As estatísticas publicadas atualmente consideram idade pediátrica como a criança/adolescente até aos 14 anos de idade (Parigi et al., 2017) e o

adulto jovem dos 15 aos 25 anos, pelo que o número de cirurgias realizadas em idade pediátrica (0-19 anos) ainda hoje permanece indefinido.

Conhecer e compreender os diferentes estágios do desenvolvimento cognitivo e psicossocial em crianças e adolescentes é fundamental para compreender as perceções dos mesmos sobre eventos relacionados com a sua saúde e habilidade de processamento de informação (LeRoy et al., 2003).

Durante o primeiro ano de vida, o lactente aprende acerca de si próprio e do mundo através da atividade sensorial e motora em desenvolvimento (Piaget, 1968, cit. in Browne, Flanigan, McComiskey, Pieper, & Zerpa, 2013) e depende dos pais/cuidadores para a realização das suas atividades de vida diárias e proteção. Nesta fase, não apresenta entendimento racional para a necessidade de cirurgia (Capurso & Ragni, 2016) e as maiores fontes de stresse são a separação dos pais e o contacto com os estranhos. Além disto, é particularmente sensível à reação dos pais, sendo capaz de depreender e absorver a ansiedade parental (Quadro 1).

Os *toddlers* (12 a 36 meses), têm medo do escuro, de serem "abandonados" ou de ver a sua integridade corporal ameaçada. A sua experiência reduzida sobre os cuidados de saúde torna-os mais ansiosos e receosos, consequentemente, apresentam maior vulnerabilidade ao stresse do processo cirúrgico (Book, Goedeke, Poplawski & Muensterer, 2020). As crianças nesta faixa etária respondem bem à distração, ao brincar e à presença calma dos pais (Short, 2013), (Quadro 1). O principal *stressor* psicossocial nesta faixa etária é a ansiedade da separação. Permitir que a mãe/pai acompanhe a criança tanto quanto possível ao longo da experiência perioperatória é uma das intervenções de enfermagem mais apropriadas para esta faixa etária (Mower, 2015).

As crianças em idade pré-escolar (estágio pré-operatório - Piaget, 1968), apesar de não possuírem pensamento abstrato, deixam de estar limitadas ao meio sensorial imediato. Conseguem assimilar quantidades limitadas de informação, em linguagem simples, com recurso a sessões de brincadeira terapêutica, manuseamento de equipamentos hospitalares ou utilização de livros ilustrados para antecipar o que vai acontecer (Capurso & Ragni, 2016; LeRoy et al., 2003). Preocupam-se com a sua integridade corporal, com a mutilação cirúrgica e a separação dos pais (ansiedade da separação) (Lee et al., 2013; Moro & Módolo, 2004). Como têm um conceito limitado de tempo, podem perceber o evento de hospitalização associado à cirurgia como uma punição (Capurso & Ragni, 2016; Short, 2013). Por essa razão, é importante salientar à criança que a condição de saúde não é culpa sua, explicar qual a parte do corpo que está afetada e reforçar que as outras não estão envolvidas (Short, 2013). A presença e envolvimento dos pais nos cuidados durante este período atenua os efeitos negativos que o evento cirúrgico possa ter na criança, atuando como um fator modulador na experiência da ansiedade, medo e dor (Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006), (Quadro 1). Nesta faixa etária, a criança beneficia de intervenções mais próximas da realização da cirurgia, cerca de 24 horas antes (Mower, 2015).

Quadro 1 Estádios de desenvolvimento e influência na preparação pré-operatória.

Idade	**<12 meses**	**≥12 meses <36 meses**	**≥36 meses <5 anos**	**≥5 anos <12 anos**	**≥12 anos <19 anos**
	Lactente	***Toddler***	**Pré-escolar**	**Idade escolar**	**Adolescência**
Desenvolvimento cognitivo	Dependente da atividade sensorial; Características motoras em desenvolvimento.	Pensamento egocêntrico; Compreensão da linguagem simples; Competências verbais em desenvolvimento.	Muito curioso; Pensamento ainda egocêntrico.	Pensamento lógico; Consegue considerar outros pontos de vista; Compreende o funcionamento do corpo (>9 anos).	Raciocínio maduro; Pensamento dedutivo e hipotético; Elevado nível de compreensão sobre as funções corporais e os efeitos da doença.
Desenvolvimento psicossocial	Desenvolvimento da confiança; Depende dos outros para a satisfação das suas necessidades.	Desenvolvimento da habilidade de controlo do seu próprio corpo e emoções.	Mais independente; Imaginação ativa; Mistura fantasia com realidade (pensamento mágico).	Orientado para a realização; Desenvolvimento de mestria e autoestima.	Desenvolvimento da identidade e autonomia.
Medos específicos	Separação dos pais; Estranhos.	Separação dos pais; Do escuro ou de ser abandonado, mesmo que por um período de tempo curto; Ameaça aos limites corporais; Dor.	Separação; Perda de controlo; Lesão corporal; Dor.	Perda de controlo (físico ou emocional); Dano corporal; Separação da família e do grupo de pares; Morte; Ser castigado; Ser ferido.	Perda de controlo ou autonomia; De ficar desfigurado ou incapacitado.
Mecanismos de *coping*	Dependente da presença parental; Ansiedade perante estranhos; Choro.	Dependente da presença parental; Mecanismos diminuídos em ambiente desconhecido; Perda de controlo; Agressividade; Hiperatividade.	Depende da presença parental; Começa a adquirir alguns mecanismos *coping* (ex. fantasia); Regressão; Culpa.	Reportório pequeno de mecanismos de *coping*; Podem ser ensinados mecanismos de *coping*; Preparação útil; Comportamento exigente.	Maior número de mecanismos de *coping*; Atitude difícil; Depressão; Independência; Raiva/Frustração.
Intervenções	Assegurar a presença dos pais; Manter rotina; Limitar a presença de estranhos.	Assegurar presença dos pais; Oportunidades para controlar o próprio corpo (dar escolhas, se possível); Brincar terapêutico.	Assegurar a presença parental; Explicação do que irá acontecer; Permitir a participação nos seus próprios cuidados; Brincar terapêutico.	Preparação parental, do grupo de pares ou suporte de um outro adulto; Ensino de habilidades de *coping*; Assegurar a privacidade; Explicação dos procedimentos usando o brincar terapêutico; Encorajar a criança a participar nos cuidados, socializar com o grupo de pares e manter o trabalho escolar.	Permitir suporte parental e do grupo de pares; Ensino de mecanismos de *coping*; Assegurar privacidade; Incentivar a participação nos cuidados; Discussão completa da cirurgia.

Adaptado de: Browne, Flanigan, McComiskey, Pieper, & Zerpa (2013); Shields (2010).

A partir dos 6 anos de idade, e até aos 11-12 anos (período operacional concreto em Piaget), a separação dos pais é menos problemática. No entanto, os pais continuam a ter um papel fundamental na sua vida, sendo vistos como o núcleo das relações da criança (Papalia et al., 2001, cit. in Brázio, 2014) e o grupo de pares como o ponto de conforto e segurança emocional (Brázio, 2014). Por terem melhores habilidades linguísticas e pensamento lógico, experienciam os *stressores* associados à cirurgia de uma forma mais realística do que as crianças em idade pré-escolar. Habitualmente são curiosas, conseguem compreender quando algo no seu corpo não está bem e são capazes de controlar melhor as suas emoções mais negativas (mecanismos de *coping*) (Brázio, 2014; Yadav, 2020). Têm medo de acordar durante a cirurgia ou de não acordar (Moro & Módolo, 2004), da separação dos pares e dos membros da família (Capurso & Ragni, 2016). Enquanto nos estágios anteriores a criança beneficiava de uma preparação mais próxima da data de cirurgia, nesta fase, beneficiam se a exposição ocorrer algumas semanas antes (Kain et al., 2009; LeRoy et al., 2003; Mower, 2015). A visita pré-operatória é geralmente útil nesta idade e as crianças devem ser convidadas a participar nos seus cuidados (por exemplo, segurar a máscara durante a indução anestésica) (Clark & Langford, 2009), (cf. Quadro 1).

Durante o período operacional formal (12+ anos), o adolescente compreende a informação que lhe é transmitida relativamente ao procedimento cirúrgico, mas há a preocupação com a sua imagem corporal, possibilidade de morrer, perder o controlo e autonomia, localização e extensão de cicatrizes cirúrgicas (Ahmed & Rufo, 2020; Hockenberry, Wilson & Rodgers, 2017, 2019), que pode levar a ansiedade e angústia (Capurso & Ragni, 2016). O adolescente tem as suas características únicas, emocionais e psicossociais, que o diferem marcadamente dos restantes grupos etários (Mower, 2015). Nesta fase há um despreendimento dos pais em detrimento dos pares (LeRoy et al., 2003), que constituem uma grande influência (Sawyer et al., 2012). Pela fase de crescimento biológico em que se encontram, estão mais propensos a mudanças de humor e, em situações de stresse, podem adotar um comportamento considerado 'mais infantil' (Sawyer et al., 2012), (Quadro 1). É fundamental proporcionar um ambiente calmo e dar tempo para que os adolescentes abordem as suas preocupações antes da cirurgia para a obtenção bons resultados no pós-operatório (Mower, 2015).

Teorias de processamento de informação sugerem que estes aspetos do desenvolvimento não ocorrem em estágios distintos do desenvolvimento, mas como um processo contínuo (Short, 2013). Experiências anteriores, o tipo de cirurgia, competências inatas ou adquiridas e suporte disponível também determinam a forma como crianças e adolescentes reagem (Marques, Santos, Mendes, Nelas, Monteiro, Monteiro, et al., 2011; Kar, Ganguly, Dasgupta, & Goswami, 2015; Hockenberry, et al., 2019).

A preparação pré-operatória da criança/adolescente, tendo em consideração todos estes aspetos, não deve ocorrer de forma isolada, mas sim centrada na família; o enfermeiro deve, também, ter em consideração o ambiente em que esta está inserida. O enfermeiro especialista em Saúde Infantil e Pediátrica, em contexto perioperatório, assume um papel

preponderante. Ele cuida de clientes pediátricos que precisam de intervenção cirúrgica em diversos ambientes e utiliza a prática baseada na evidência para proteger, promover e otimizar a saúde e habilidades, desde o recém-nascido à idade adulta jovem (American Pediatric Surgical Nurses Association, 2021). Mais ainda, utiliza um modelo conceptual centrado no binómio criança e família e encara este como o beneficiário dos seus cuidados (Regulamento n.º 422/2018 das Competências do Enfermeiro Especialista em Enfermagem de Saúde Infantil e Pediatria, 2018). Como tal, avalia e responde às necessidades da família e capacita-a nas diferentes dimensões (*ibid.*, 2018). Quanto mais conhecimentos, capacidades e habilidades a família tiver, com maior confiança vive as adaptações às mudanças na saúde e dinâmica familiar que a intervenção cirúrgica possa envolver. Este empoderamento permitir-lhes-á responder de forma mais eficaz às necessidades da criança/adolescente. A participação ativa e infomada dos pais no processo perioperatório dos seus filhos é um fator importante na gestão da ansiedade, dor e comportamentos dos seus filhos.

A ansiedade é caracterizada por uma emoção negativa, sentimentos de ameaça, perigo ou angústia (International Council of Nurses, 2019), uma reação ou experiência subjetiva a uma situação que é percebida como stressante ou perigosa. Pode causar respostas fisiológicas e psicológicas em crianças/adolescentes como elevação da frequência cardíaca, tensão arterial, temperatura corporal e suor; alterações comportamentais como inquietação, medo, choro e diminuição da interação e comunicação com os outros (Li & Lopez, 2006). Mais ainda, pode resultar em indução anestésica mais demorada, aumento do risco de eventos adversos e dos níveis de cortisol e consequente aumento do tempo de recuperação (Bogusaite et al., 2018).

Embora a ansiedade pré-operatória seja considerada uma experiência normal (Pritchard, 2009), as crianças e adolescentes que experienciam ansiedade no período pré-operatório tendem a necessitar de maiores doses de analgesia no período pós-operatório, por menor tolerância à dor, e apresentam distúrbios do sono, emocionais ou até mesmo comportamentais (Fortier, Rosario, Martin, & Kain, 2010; Kain et al., 2006).

A ansiedade dos pais reporta-se à ansiedade manifestada durante o período perioperatório do filho (Chartrand et al., 2017). Níveis elevados de ansiedade nos pais podem causar níveis elevados de ansiedade nos filhos (Bogusaite et al., 2018). Fatores ligados à ansiedade e sofrimento emocional em pais e filhos incluem a falta de familiarização com o ambiente cirúrgico e preparação pré-operatória inadequada (Bogusaite et al., 2018; Kain, Mayes, & Caramico, 1996). Por estas razões, as famílias e as crianças devem ser informadas e preparadas, para que possam gerir a ansiedade (Bogusaite et al., 2018).

Apesar de estarem relacionadas, e de se influenciarem mutuamente durante o período perioperatório (Chartrand et al., 2017), a ansiedade e a dor são conceitos distintos.

A dor é uma experiência pessoal, "sensorial e emocional desagradável associada, ou semelhante àquela associada, a uma lesão tecidular concreta ou potencial" (Raja, Carr, Cohen, Finnerup, Flor, Gibson, Keefe, et al., 2020). Pode ser influenciada por diversos níveis de fatores biológicos, psicológicos, sociais e ambientais (Raja, et al., 2020). O controlo da dor pós-operatória constitui um desafio em pediatria pelas diferenças de perceção e expressão em comparação com adultos (Hanci et al., 2012). Considerando a grande variabilidade de expressões da dor na criança/adolescente, os enfermeiros têm um papel crucial no seu reconhecimento e avaliação. A sua avaliação, interpretação e oportuna intervenção, em parceria com os pais, é fundamental. A dor pós-operatória mal controlada está associada a uma recuperação mais longa, maior risco de complicações, hospitalização prolongada, readmissões não planeadas e dor crónica pós-cirúrgica, com uma incidência de 12 a 80% até um ano após a cirurgia (Campbell, 2013). Habitualmente, os pais com conhecimento inadequado sobre estratégias de alívio da dor no pós-operatório, usam fármacos analgésicos de forma também inadequada nos seus filhos (Voepel-Lewis, Zikmund-Fisher, Smith, Zyzanski, & Tait, 2015). Por esta razão, estudos apontam que a dor pós-operatória das crianças é, muitas vezes, desvalorizada e subtratada (Zhu et al., 2018). A educação sobre a gestão da dor pós-operatória pode auxiliar os pais a melhorar o seu conhecimento nesta área e fazer uso de estratégias não farmacológicas para o alívio da dor (Zhu et al., 2018).

A ansiedade parental é outro fator que se alia à ansiedade manifestada pela criança no pré-operatório e, consequentemente, à dor manifestada no pós-operatório.

Os pais que manifestam menores níveis de ansiedade, cujas crianças receberam medicação pré-operatória e que puderam estar presentes no momento da indução anestésica revelaram-se mais satisfeitos com os cuidados prestados aos filhos durante o período perioperatório (Shafer, Jenkins, Fortier, Stevenson, & Hikita, 2018). Mais ainda, aqueles que receberam informação pré-operatória não só experimentaram uma redução na ansiedade, como se manifestaram mais satisfeitos (Ghabeli, Moheb, & Nasab, 2014).

Das intervenções que o enfermeiro pode adotar, sem necessidade de prescrição, em contexto pré-operatório para gestão da ansiedade, e consequente modulação da dor e comportamento, destacam-se as intervenções comportamentais, psicológicas e as educativas.

As primeiras envolvem a distração da criança (através de jogos, utilização de dispositivos eletrónicos (*tablets*, telemóveis), "doutores-palhaço" e desenhos animados) e sua familiarização com o ambiente desconhecido. Pela componente psicológica que pode ter associada, as intervenções comportamentais podem ser agrupadas em cognitivo-comportamentais (Agbayani, Fortier & Kain, 2020).

As intervenções psicológicas visam melhorar os mecanismos de *coping*, autocontrolo e colaboração da criança/adolescente durante o processo cirúrgico. Embora eficazes, são

intervenções dispendiosas pois requerem várias sessões (Meletti, Meletti, Camargo, Silva & Módolo, 2019). Um fator mediador no controlo da ansiedade da criança é a presença dos pais durante a indução anestésica (Capurso & Ragni, 2016). Tal tem em consideração os princípios de que os pais são fonte de confiança e suporte para a criança e facilitam a adaptação da mesma a um ambiente desconhecido (Capurso & Ragni, 2016). No entanto, a sua implementação é controversa, não só pela aparente ausência de eficácia (Erhaze, Dowling & Devane, 2016; Manyande, Cyna, Yip, Chooi & Middleton, 2015), como pelos efeitos antagónicos que pode ter na criança.

As intervenções educativas fornecem informações sobre o procedimento cirúrgico planeado (curso da cirurgia, quem estará envolvido e o que a criança/adolescente poderá sentir), o período pré e pós-operatório expectável e sinais e sintomas que decorrem da intervenção cirúrgica. Visam prevenir a ansiedade perioperatória, prevenir a dor aguda pós-operatória de crianças e adolescentes e aumentar a confiança e o conhecimento de crianças, adolescentes e pais sobre os cuidados perioperatórios, como comer e beber, posicionamento a adotar, analgesia e estratégias de *coping* (Agbayani, Fortier & Kain, 2020; Chartrand et al., 2017; Lee et al., 2013; Lin et al., 2018).

As intervenções educativas, que geralmente são aplicadas no período pré-operatório, podem tomar duas formas: verbal ou escrita. São exemplos livros, panfletos ou guias; programas ou sessões de ensino (presenciais, via web ou áudio), jogos, vídeos ou *DVDs* (Baghele, Dave, Dias, & Shah, 2019; Chow, Van Lieshout, Schmidt, Dobson, & Buckley, 2016; Kain, Fortier, Chorney, & Mayes, 2015; Zhu et al., 2018). Os programas de preparação educativos incluem uma visita à Unidade, bloco operatório e recobro, orientação relativa ao equipamento médico e as suas funções e representações visuais dos procedimentos perioperatórios (Agbayani, Fortier & Kain, 2020).

Idealmente, a educação pré-operatória deve ser disponibilizada em diversos formatos (verbal e escrita) de forma a facilitar a retenção de informação (Mower, 2015). O envolvimento da família no processo educativo constitui um elemento-chave, pois a criança/adolescente pode não se recordar de toda a informação fornecida em consequência da ansiedade que vivencia (Mower, 2015).

Atualmente, a maior parte da informação pré-operatória é fornecida de forma verbal pelo cirurgião ou por outros elementos da equipa presentes no dia da cirurgia (Bogusaite et al., 2018). Num estudo em que foram avaliadas as necessidades de informação e metodologia mais requisitada, quer pelos pais, quer pelas crianças, a maioria (78,9% dos pais e 51,2% das crianças e adolescentes entre os 10 e os 17 anos) preferia que a informação lhe fosse dada de forma escrita, sob a forma de panfletos, e no dia anterior à cirurgia (Bogusaite et al., 2018).

O fornecimento de informação adequada, no tempo certo, adaptada ao desenvolvimento cognitivo e características de cada criança/adolescente (Perry, et al., 2012), pode reduzir os efeitos traumáticos da cirurgia, melhorar os mecanismos de *coping* da díade e permitir o desenvolvimento de uma relação de confiança entre família e a equipa multidisciplinar (Astuto et al., 2006). Estes resultados são particularmente importantes e podem estar relacionados com o aumento da sensação de autocontrolo da criança e gestão das expectativas da família relativamente à cirurgia e período de hospitalização (Jaaniste, Hayes, & Von Baeyer, 2007).

A implementação de intervenções educativas pode ter um efeito positivo na ansiedade de pais e filhos, conhecimento, na gestão de atitudes e comportamentos pós-operatórios, no tempo de recuperação e na satisfação com cuidados perioperatórios e evento cirúrgico (Bogusaite et al., 2018; He, Zhu, Chan, Liam, et al., 2015; Jaaniste et al., 2007).

Assim, no âmbito do Curso de Mestrado em Enfermagem de Saúde Infantil e Pediátrica surge a presente dissertação cujo objetivo é avaliar a efetividade das intervenções educativas centradas na família na ansiedade, dor e comportamento de crianças e adolescentes (três aos 19 anos) e na ansiedade dos seus pais no período perioperatório. Para cumprir este objetivo, foi conduzida uma revisão sistemática de efetividade, seguindo as orientações metodológicas da Joanna Briggs Institute (JBI).

Esta dissertação, para além da introdução, encontra-se estruturada em dois capítulos. No capítulo 1 é apresentada a Metodologia e a justificação para a escolha de uma revisão sistemática de efetividade.

O capítulo 2 inclui dois artigos. O primeiro, Protocolo de Revisão Sistemática da Literatura, discrimina todo o procedimento a adotar na realização da revisão de efetividade. O segundo artigo, corresponde ao relatório da Revisão Sistemática com Meta-análise.

Pelas exigências das revistas onde foram submetidos os artigos, o primeiro encontra-se em Inglês americano (EUA) e o segundo em Inglês australiano (AUS). De igual forma, as referências bibliográficas de cada um seguem a norma adotada pela revista a que foram submetidos.

CAPÍTULO 1. METODOLOGIA

Com o *boom* tecnológico, a quantidade de informação disponível é vasta e continua a expandir-se cada vez mais (Aveyard, 2018). Este volume colossal de informação, por vezes contraditória (Galvão & Pereira, 2014), torna o processo de decisão clínica cada vez mais complexo e exigente. A prática baseada na evidência (PBE) surge, exatamente, para reduzir a lacuna existente entre a melhor evidência científica e a prática de cuidados (Araújo, 2014).

A prática baseada na evidência envolve não só considerar a melhor evidência disponível, mas também a capacidade de utilizar o próprio julgamento clínico e ter em consideração as preferências do cliente (Aveyard & Sharp, 2017, cit. in Aveyard, 2018). A revisão sistemática da literatura contribui para suportar a evidência que utilizamos na nossa prática clínica diária. É, por isso, uma ferramenta que facilita a identificação, seleção, análise e síntese das evidências sobre determinado tópico/questão, realizada de forma sistemática para que toda a informação disponível seja incorporada (Aveyard, 2018; Bettany-Saltikov & McSherry, 2016).

Pelo desenho do estudo, a revisão sistemática da literatura é considerada um estudo secundário, pois contém estudos primários na sua fonte de dados (Galvão & Pereira, 2014). É inserida no paradigma positivista e surge no topo da tabela dos níveis de evidência científica por tipo de estudo (Aveyard, 2018). É frequentemente procurada por profissionais de saúde, não só para informar, suportar e atualizar a tomada de decisão clínica, como também, para orientar futuras investigações (Tufanaru, Munn, Aromataris, Campbell, & Hopp, 2020).

A utilização de um método claro, rigoroso e reprodutível aquando da realização de uma revisão sistemática da literatura (RSL) tem como finalidade reduzir possíveis enviesamentos, próprios das revisões narrativas (Bettany-Saltikov & McSherry, 2016). Por essa razão, as revisões sistemáticas da literatura devem ser acompanhadas de um plano definido *a priori* (protocolo de revisão) que explicite a forma como os investigadores pretendem responder às questões de investigação. A qualidade de uma revisão sistemática dependerá da extensão em que os métodos são escrupulosamente seguidos de forma a minimizar o risco de erro e viés durante o processo de revisão (Aromatis & Munn, 2020). Por este motivo, o delineamento antecipado da metodologia da investigação é, para Bettany-Saltikov & Mcherry (2016), crucial no processo de revisão.

Uma revisão sistemática da literatura pode incluir meta-análise quando é possível combinar dados de diferentes estudos primários sobre um determinado tema e derivar conclusões e recomendações sobre esse tópico de pesquisa (Haidich, 2010).

No sentido de procurar a melhor evidência disponível acerca da efetividade das intervenções educativas centradas na família para os *outcomes* de ansiedade, dor e comportamentos de crianças/adolescentes submetidos a cirurgia eletiva e ansiedade dos seus pais, no período perioperatório, surge a presente investigação. Para a elaboração desta revisão, foi seguida a metodologia do JBI para condução e preparação de revisões sistemáticas de efetividade (Tufanaru et al., 2020). Este tipo de revisão é projetado para determinar o grau em que a intervenção de interesse – neste caso, intervenções educativas – atinge o efeito desejado e fornece detalhes sobre o tamanho do efeito, direção e causalidade potencial (Tufanaru et al., 2020).

O processo de revisão sistemática de efetividade do JBI fornece etapas fundamentais para a realização da revisão, incluindo a elaboração prévia de um protocolo de revisão (Aromatis & Munn, 2020; Bettany-Saltikov & Mcherry, 2016). Este pré-define os objetivos e métodos a utilizar na revisão sistemática, permitindo não só a definição de uma linha condutora para os investigadores, evitando vieses, como ainda evidenciar a transparência ao longo de todo o processo (Apóstolo, 2017; Aromatis & Munn, 2020).

Como sugerido pelo manual para síntese de evidência do JBI (Aromatis & Munn, 2020), o título da revisão foi primeiramente registado no PROSPERO - Prospective Register of Systematic Reviews (CRD42020211574). Tanto o protocolo de revisão sistemática como o relatório de síntese da literatura foram submetidos para publicação, sob a forma de artigo, em revistas *peer-reviewed* não sujeitas a custos e de acesso livre.

CAPÍTULO 2. SÍNTESE DA EVIDÊNCIA

Este capítulo identifica a melhor evidência científica sobre o tema e é dividido em dois subcapítulos.

No primeiro subcapítulo (Artigo 1), correspondente ao protocolo de revisão sistemática, são descritas as diferentes fases do processo de investigação, questões de investigação, critérios de inclusão e opção metodológica.

No segundo subcapítulo (Artigo 2), encontra-se o relatório da Revisão Sistemática com Meta-análise, em que é dado cumprimento ao protocolo definido *a priori*. Apresenta as características dos estudos incluídos na revisão, resultados e evidência encontrada quanto à efetividade das intervenções educativas centradas na família no período perioperatório, e as implicações para a prática clínica e para futura investigação.

Deste trabalho de investigação, resultaram os seguintes artigos submetidos a revistas científicas para publicação:

Martins Esteves, I., Coelho, M., Cardoso, D., Pestana-Santos, M., & Reis Santos, M. (s.d.). *Effectiveness of perioperative family-centred educational interventions on the outcomes of children/adolescents and their parents: systematic review protocol*.
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Disciplina: Enfermagem

Indexação (2021): Literatura Latinoamericana em Ciencias de la Salud (LILACS), Latindex, DOAJ, Redalyc e Dialnet

Martins Esteves, I., Coelho, M., Neves, H., Pestana-Santos, M., & Reis Santos, M. (s.d.). *Effectiveness of perioperative family-centred educational interventions in the anxiety, pain and behaviours of children/adolescents and their parents' anxiety in the perioperative period: systematic review and meta-analysis*.

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Disciplina: Enfermagem Avançada e Especializada (Q2)

Fator de Impacto SJR® (2021): 0,261

Artigo 1

Effectiveness of perioperative family-centered educational interventions on the outcomes of children/adolescents and their parents: systematic review protocol

Abstract

Objective: This review aims to evaluate the effectiveness of family-centered educational interventions in the anxiety, pain and behaviors of children/adolescents and their parents' anxiety in the perioperative period.

Introduction: Between 50 to 75% of children and adolescents who undergo surgery experience fear and anxiety during the preoperative period, emotions also common to parents. Educational interventions should be, as much as possible, centered on the family, taking into consideration the stage of cognitive development of children and adolescents.

Inclusion criteria: This review will consider studies in which the perioperative educational interventions have been applied to children and adolescents and their parents. The main outcomes are anxiety, pain and behaviors in children/adolescents and parents' anxiety. Experimental and quasi-experimental study designs will be considered for this review.

Methods: This review will follow the Joanna Briggs Institute guidelines for systematic reviews of effectiveness. An initial limited search of PubMed and CINAHL has been undertaken. It will be followed by a second search for published and unpublished studies from January 2007 available in English, Spanish and Portuguese. After full texts are retrieved, the methodological quality assessment and data extraction will be independently critically appraised by two reviewers and presented in a tabular form. A narrative synthesis will accompany the results and, if possible, a meta-analysis will be performed, and a Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Summary of Findings presented.

Systematic review registration number: PROSPERO [CRD42020211574]

Keywords: anxiety; child; education; pain; family-centered care

Abstract word count: [239/250 words]

Total manuscript word count: [2478/2500 words

Introduction

In the United States of America, approximately 5 million children and adolescents undergo surgical procedures yearly.[1] In Portugal, of the 970.200 surgeries performed in 2018, 17.482 were at pediatric age - up to 14 years old.[2] Although efforts were made to find data from other countries, it was not possible to find statistics on pediatric surgery.

Nearly 50 to 75% of children and adolescents undergoing surgery experience fear and anxiety during the preoperative period.[1] Parental perioperative anxiety has also been reported as very common (74.2%).[3] Anxiety is defined as apprehensiveness or anticipation of future threat, accompanied by a feeling of worry and autonomic response.[4]

Children are particularly vulnerable to the stress and anxiety surrounding surgery due to their cognitive development, experience, and knowledge about health care.[5] Children and adolescents who experience anxiety preoperatively tend to need higher analgesia doses in the postoperative period, reporting having sleep, emotional, or even behavioral disorders.[6] Furthermore, these outcomes can also be correlated with lower ratings for a family experience, increased healthcare costs due to the extended stays in recovery areas, and the need for postoperative care.[7] Perioperative care comprises preoperative, intraoperative, and postoperative care.[8] Although distinct, these overlap, the way the family faces and perceives the surgical event directly interferes with the level of anxiety and the behavior of the child/adolescent in the perioperative period.[9] For instance, their anxiety can be reflected in their children/adolescent's anxiety.[10] Parental anxiety has also been linked with postoperative negative behavioral changes in the child, specifically nightmares, separation anxiety, eating problems, and fear.[10]

Parents' anxiety reports to their anxiety over time, in the perioperative period of their child.[11] Parents with lower levels of anxiety, whose children received preoperative medication and who could be present at the time of anesthetic induction, were more satisfied with their children's care.[12] Furthermore, those who received preoperative information not only reduced their anxiety but also expressed more satisfaction.[13]

Children's anxiety and pain, despite being related and influencing each other in the perioperative period,[11] are distinct concepts.[8] Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.[14] Poorly controlled postoperative pain is associated with longer recovery, increased risk of complications, prolonged hospitalization, unplanned readmissions, and chronic post-surgical pain with an incidence of 38% up to one year after surgery.[15]

Child/adolescent behavior can be defined as any observable response or action to the perioperative experience. Postoperative behavioral changes such as sleep, eating and emotional disorders (anxiety, depression, fear) are common (up to 60%)[16] and ultimately,

may lead to "developmental regression", especially in younger children.[17] This refers to loss of a previously gained developmental milestones, such as loss of bladder control or loss of language abilities.[16]

Therefore, healthcare professionals must be sensitive to recognizing and intervening in children/adolescents and their family's needs to provide a humanized and integral care.[18] Family-centered care is a philosophy of care for children and their families within health services[19] that recognizes the importance of the family in the patient's life[20] and in which the care is planned around the dyad.[19]

Even though the first steps towards family-centered care in pediatrics were taken by John Bowlby (1944), it was in the 60s and 70s (post-World War II) that Bowlby's theories were turned into practice by James Robertson.[19] However, it was in 2007 that family-centered pre-surgical preparation programs for children undergoing surgery emerged and became prominent.[21] Later, in 2010, Dr. Chorney and Dr. Kain proposed the first perioperative family-centered care framework.[9]

A family-centered perioperative care approach that allows both children/adolescents and parents' participation offers a positive experience for everyone and has shown to decrease perioperative anxiety.[21,22] Parents are a primary source of strength and support[20] and the ones who know their child best; therefore, they should be encouraged to have active participation in perioperative care.[11] The presence of parents acts as a modulating factor in the child's anxiety, fear, and pain in the perioperative period.[6,9]

Pre-surgical preparation programs focused on the family as a whole have implications for postoperative results, namely in children/adolescents and parents' anxiety, children/adolescents' pain, as well as in the incidence of delirium and consumption of analgesics, and time until discharge.[21,23,24] These could also affect the acquisition of knowledge, satisfaction, and parents' behaviors in managing their children's postoperative pain.[11,25] Within perioperative programs, educational interventions are prominent. They were first introduced to give the opportunity to the family to learn about the surgery's process and build a relationship with healthcare professionals when surgery requires an extended stay in the hospital.[7] They consist of providing information and preparation relevant to the forthcoming surgical procedure to both child/adolescent and their parents, namely the expected pre and postoperative period and the signs and symptoms that may result from the surgical intervention.[26] The involvement of both parents and children in preoperative education can have significant benefits in the anxiety, engagement and understanding, and satisfaction with the surgical process.[27]

The educational interventions are cost-effective, non-invasive, and carry a low risk for adverse effects.[7] These interventions develop realistic and manageable expectations about the perioperative course, aiming to manage perioperative anxiety and pain in children/adolescents, feeling of loss of control, and promoting a faster recovery.[1,7]

Moreover, these aim to increase parents' confidence and knowledge about postoperative treatment, such as eating and drinking, positioning, analgesia, and coping strategies.[11,28,29] Generally applied in the preoperative period, educational interventions can take different forms: verbal, written, or both. Books, pamphlets, guides, teaching programs or sessions (whether face-to-face, via web or audio), games, videos, and DVDs are examples of educational interventions.[30-33]

Systematic reviews published on the topic evaluated the effectiveness of educational programs in children (2-12 years old) in their anxiety and other negative emotions[35] and the effectiveness of audiovisual interventions at reducing preoperative anxiety in children/adolescents under 18 years of age.[32] In both, the educational interventions reduce anxiety (primary outcome) effectively[32,34]; the authors reported that children aged 4 to 6 years old or older benefit more from these programs, whereas younger children have the reversal effect.[34]

However, none of them, to our knowledge, has evaluated the effectiveness of the educational interventions using a family-centered care approach to manage anxiety, pain, and behaviors in children and their parents' anxiety in the perioperative period. Therefore, there is a need to summarize these findings and evaluate their effectiveness to provide the best evidence to health care professionals who work daily with children/adolescents and their families and use a family-centered care approach in the perioperative context.

A preliminary search of PROSPERO, MEDLINE, CINAHAL, the Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis* was conducted on March 5th 2021, and no current or underway systematic reviews on the topic were identified.

The objective of this systematic review is to evaluate the effectiveness of family-centered educational interventions in the anxiety, pain, and behaviors of children/adolescents and their parents' anxiety in the perioperative period.

Review question(s)

What is the effectiveness of family-centered educational interventions in the anxiety, pain, and behaviors of children and adolescents in the perioperative period?

What is the effectiveness of family-centered educational interventions in parents' anxiety in the perioperative period?

Inclusion Criteria

Participants

This review will consider studies that include parents and their children/adolescents – 3 to 19 years old – undergoing elective or scheduled surgery under general anesthesia, regardless of the type of surgery. We will include only children from 3 years of age because they understand simple language, are able to communicate autonomously, and benefit from therapeutic play.[35]

Outpatient, day, and/or ambulatory surgery will also be included. Children/adolescents undergoing local or regional anesthesia will be excluded.

Intervention(s)

This review will consider studies that evaluate the effectiveness of family-centered educational interventions performed with children/adolescents and their parents in the perioperative period.

The educative interventions may include any printed, written material such as books, booklets, or guides; teaching sessions or programs, whether face-to-face, via the web or audio; games, videos, or DVDs. There are no limitations to the mode of delivery, frequency, dose, or who delivers the intervention.

Comparator(s)

This review will consider studies that used any comparator such as, routine/standard preoperative care, or even without comparator.

Outcomes

This review will consider studies that include the following outcomes for children/adolescents:

- pain as assessed by any validated instrument such as, but not limited to, the Visual Analogue Scale (VAS), the FLACC Behavioral Pain Scale, and the Numerical Pain Assessment Scale.
- anxiety, assessed by any validated instrument such as, but not limited to, the Modified Yale Preoperative Anxiety Scale (mYPAS), The State-Trait Anxiety

Inventory for Children (STAIC), or the Visual Analogue Scale for Anxiety (VAS-A).

- behaviors, such as such as sleep and emotional disorders, assessed by any validated instrument such as, but not limited to, Children's Emotional Manifestation Scale (CMES) for emotional behaviors; Post Hospitalization Behavioral Questionnaire for Ambulatory Surgery.

This review will consider studies that include the following outcomes for parents:

- anxiety, assessed by any validated instrument such as, but not limited to, The State-Trait Anxiety Inventory for Adults (STAI).

Types of studies

This review will consider experimental and quasi-experimental study designs, including randomized controlled trials, non-randomized controlled trials, and before and after studies.

Methods

The proposed systematic review will be conducted following the JBI methodology for systematic reviews of effectiveness[36] and the PRISMA model for organizing the information found.[37] This review has been registered with PROSPERO (CDR42020211574).

Search strategy

The search strategy will aim to locate both published and unpublished studies. An initial limited search of MEDLINE (PubMed) and CINAHL (EBSCOhost) was undertaken to identify articles on the topic. The text words in the titles and abstracts of relevant articles and the index terms used to describe the articles were used to develop a full search strategy for MEDLINE (PubMed) (see Appendix I). The search strategy, including all identified keywords and index terms, will be adapted for each included information source. The reference lists of all studies selected for critical appraisal will be screened for additional studies.

Studies published in English, Spanish and Portuguese will be included. Studies published from January 1st, 2007 will be included. Even though the first steps towards family-centered care were taken in the 60s and 70s (post-World War II)[19], and the first perioperative family-centered care framework only appeared in 2010[9], it was in 2007 that pediatric family-centered surgical preparation became prominent and structured[21]. There is no geographical

or cultural limitation for the acceptance of studies.

The databases to be searched include MEDLINE (via PubMed), CINAHL (via EBSCOhost), PsycINFO (via EBSCOhost), Cochrane Central Register of Controlled Trials (via EBSCOhost), and SciELO. Sources of unpublished studies and gray literature to be searched include OpenGrey, Open Access Theses and Dissertations, and *Repositório Científico de Acesso Aberto em Portugal* (RCAAP).

Study selection

Following the search, all identified citations will be collated and uploaded into EndNote X9.3 (Clarivate Analytics, PA, USA) and duplicates removed. Following a pilot test, titles and abstracts will then be screened by two independent reviewers (IE, MC) for assessment against the inclusion criteria for the review. Potentially relevant studies will be retrieved in full, and their citation details imported into the JBI System for the Unified Management, Assessment, and Review of Information.[38] The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers (IE, MC). Reasons for excluding full-text studies that do not meet the inclusion criteria will be recorded and reported in the systematic review. Any disagreements between the reviewers at each stage of the study selection process will be resolved through discussion or with a third reviewer (MPS). The search and study selection and inclusion process results will be reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram.[37]

Assessment of methodological quality

Eligible studies will be critically appraised by two independent reviewers (IE, MC) for methodological quality in the review using standardized critical appraisal instruments from JBI for experimental and quasi-experimental studies.[36] Authors of papers will be contacted to request missing or additional data for clarification, where required. Any disagreements between the reviewers (IE, MC) will be resolved through discussion or with a third reviewer (MPS). The results of the critical appraisal will be reported in a table with an accompanying narrative.

Following the critical appraisal, studies that do not meet a certain quality threshold (7-13 indicators answered in the affirmative for RCTS and 6-9 for quasi-experimental studies) will be excluded. This decision will be based on the reviewers' overall assessment of quality and risk of bias. If a limited quantity of eligible studies is found due to the low number of publications or low methodological quality, the reviewers will include all studies that meet the inclusion criteria and discuss their limitations and methodological weaknesses.

Data extraction

Data will be extracted from studies included in the review by two independent reviewers using the standardized JBI data extraction tool available at JBI SUMARI.[38] The data extracted will include specific details about the populations (children or adolescents and their parents), study methods, interventions (specifically, educational interventions), and outcomes of significance to the review question (anxiety, pain and behaviors of children or adolescents and parental anxiety). Any disagreements that arise between the reviewers (IE, MC) will be resolved through discussion or with a third reviewer (MPS). Authors of papers will be contacted to request missing or additional data, where required. All selected studies, regardless of their assessment of methodological quality, will be presented in a table exported from JBI SUMARI.[38]

Data synthesis

Studies will, where possible, be pooled with statistical meta-analysis using JBI SUMARI.[34] Effect sizes will be expressed as either odds ratios (for dichotomous data) or weighted (or standardized) final post-intervention mean differences (for continuous data), and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard x^2 and I^2 tests. The use of a random or fixed effects model and method for meta-analysis will be based on Tufanaru and colleagues.[36] Subgroup analyses, if appropriate, will also be considered. Wherever possible, the data will be grouped, taking into account the pediatric age groups (children or adolescents). If this is not possible, children and adolescents will be integrated into the same group. Where statistical pooling is not possible, the findings will be presented in a narrative form, including tables and figures to aid in data presentation, where appropriate.

Assessing certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence will be followed, and a Summary of Findings (SoF) will be created using GRADEPro software (McMaster University, ON, Canada).[39] The Summary of Findings will present the following information where appropriate: absolute risks for the treatment and control, estimates of relative risk, and a ranking of the quality of the evidence-based on the risk of bias, directness, heterogeneity, precision, and risk of publication bias of the review results. The outcomes reported in the Summary of Findings will be anxiety, pain and behaviors for children/adolescents. For parents, the outcome will be anxiety.

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Appendix I: Search strategy

MEDLINE (via PubMed). Search conducted on **April 13th, 2021**

Search	Query	Records retrieved
#1	adolescen*[Title/Abstract] OR teen*[Title/Abstract] OR youth[Title/Abstract] OR child*[Title/Abstract] OR paediatric*[Title/Abstract] OR pediatric*[Title/Abstract] OR parent*[Title/Abstract] OR mother*[Title/Abstract] OR father*[Title/Abstract] OR "early adulthood"[Title/Abstract] OR "young adulthood"[Title/Abstract] OR Family[Title/Abstract] OR Caregiver*[Title/Abstract] OR Care-giver[Title/Abstract] OR Carer*[Title/Abstract]	2,942,362
#2	Surg*[Title/Abstract] OR "pre-operative"[Title/Abstract] OR Preoperative[Title/Abstract] OR Perioperative[Title/Abstract] OR postoperative[Title/Abstract]	2,358,782
#3	"audiovisual aids"[Title/Abstract] OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session"[Title/Abstract] OR DVD OR "digital versatile disc"[Title/Abstract] OR video* OR leaflet* OR "non-pharmacological intervention"[Title/Abstract] OR "nonpharmacological intervention"[Title/Abstract] OR "Complementary Therapy"[Title/Abstract] OR "family centered care"[Title/Abstract] OR "family centred care"[Title/Abstract]	2,095,378
#4	pain*[Title/Abstract] OR anxiety[Title/Abstract] OR behaviour[Title/Abstract] OR behavior[Title/Abstract] OR STAI[Title/Abstract] OR "FLACC"[Title/Abstract] OR "visual analog scale"[Title/Abstract]	1,784,997
#5	"Adolescent"[Mesh] OR "Minors"[Mesh] OR "Child"[Mesh:NoExp] OR "Child, Preschool"[Mesh] OR "Family"[Mesh:NoExp] OR "Parents"[Mesh] OR "Mothers"[Mesh] OR "Fathers"[Mesh] OR "Caregivers"[Mesh:NoExp]	3,209,023
#6	"Elective Surgical Procedures"[Mesh] OR "Surgical Procedures, Operative"[Mesh:NoExp] OR "preoperative care"[Mesh] OR "perioperative care"[Mesh] OR "postoperative care"[Mesh]	217,009
#7	"Hypermedia"[Mesh] OR "Education"[Mesh:NoExp] OR "Teaching"[Mesh:NoExp] OR "Teaching Materials"[Mesh:NoExp] OR "Audiovisual Aids"[Mesh:NoExp] OR "Multimedia"[Mesh] OR "Videotape Recording"[Mesh] OR "Books"[Mesh:NoExp] OR "Pamphlets"[Mesh:NoExp] OR "Complementary Therapies"[Mesh:NoExp]	117,172
#8	"Pain"[Mesh:NoExp] OR "Pain, Postoperative"[Mesh:NoExp] OR "Anxiety"[Mesh:NoExp] OR "Acute Pain"[Mesh] OR "Behavior"[Mesh:NoExp]	288,558

#9	#1 OR #5	4,711,539
#10	#2 OR #6	2,414,594
#11	#3 OR #7	2,110,674
#12	#4 OR #8	1,855,885
#13	#9 AND #10 AND #11 AND #12	4,751
#14	Filters: Limited to from 2007/01/01	3,219
#15	Languages: English, Spanish and Portuguese	3,103

Artigo 2

Effectiveness of family-centered educational interventions in the anxiety, pain and behaviours of children/adolescents and their parents' anxiety in the perioperative period: systematic review and meta-analysis

Abstract

Aim: to evaluate the effectiveness of family-centred educational interventions in the anxiety, pain, and behaviours of children/adolescents (three to 19 years old) and their parents' anxiety in the perioperative period.

Design: Systematic review of effectiveness and meta-analysis.

Data Sources: MEDLINE, CINAHL, PsycINFO, Cochrane Central Register of Controlled Trials, and SciELO and Sources of unpublished studies OpenGrey, Open Access Theses and Dissertations, and RCAAP – Portugal, were systematically searched from January 2007 to April 2021 and available in English, Spanish and Portuguese.

Review Methods: This review followed the methodology for systematic reviews of effectiveness from Joanna Briggs Institute. Included studies were critically appraised using JBI Critical Appraisal Checklist for Randomised Controlled Trials and JBI Critical appraisal Checklist for Quasi-Experimental Studies. Data was synthesised through meta-analysis using a random-effects model in the Stata Statistical Software 16.0, and narrative synthesis. Two independent reviewers performed the selection process, critical analysis, and data extraction.

Results: Twenty-eight studies (26 randomised controlled trials and two quasi-randomised controlled trials) were included with a total of 2516 families. In a meta-analysis of 10 RCTS with 761 participants, preoperative anxiety management was more effective in children and adolescents who received educational interventions (SMD=−1.02; SE=0.36; 95% CI [−1.73;−0.32]). At the induction of anaesthesia, children and adolescents were significantly less anxious (SMD=−1.54; SE=0.62; 95% CI [−2.72;−0.36]) and demonstrated better compliance than controls (SMD=−1.40; SE=0.67; 95% CI [−2.72;−0.09]). Postoperative pain (SMD=−0.43; SE=0.33; 95% CI [−1.05;0.19]) and preoperative parental anxiety (SMD=−0.94; SE=1.00; 95% CI [−2.87;0.99]) were reduced in favour of the educational interventions.

Conclusion: Family-centred educational interventions probably lead to a considerable reduction of paediatric and parental anxiety and improves paediatric behaviours at induction of anaesthesia. The evidence is very uncertain regarding the effectiveness of these interventions on postoperative paediatric maladaptive behaviours and pain intensity or parental anxiety levels at the induction of anaesthesia.

Keywords: child; adolescent; education; family-centred care; pain; anxiety; behaviours; perioperative period.

Summary of Findings

Effects of educational interventions on children and adolescents' anxiety, pain and behaviours in the perioperative period

Patient or population: Children and adolescents (from three to 19 years old)
Setting: Hospital
Intervention: Educational interventions
Comparison: Standard care/comparator

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care/comparator	Risk with educational interventions				
Anxiety - Preoperative period	-	SMD **1.02 SD lower** (1.73 lower to 0.32 lower)	-	761 (10 RCTs)	⨁⨁⨁◯ MODERATE	Educational interventions probably lead to a large reduction in preoperative paediatric anxiety levels. Downgraded to moderate certainty for serious imprecision, inconsistency and publication bias.
Anxiety - Induction of anaesthesia	-	SMD **1.54 SD lower** (2.72 lower to 0.36 lower)	-	598 (7 RCTs)	⨁⨁⨁◯ MODERATE	Educational interventions probably lead to a large reduction in paediatric anxiety levels at the induction of anaesthesia.
Anxiety - Postoperative period	-	SMD **2.33 SD lower** (4.25 lower to 0.4 lower)	-	301 (4 RCTs)	⨁⨁⨁◯ MODERATE	Educational interventions probably lead to a large reduction in paediatric anxiety levels postoperatively. Downgraded to moderate certainty for serious imprecision, inconsistency and publication bias.
Behaviour - Induction of anaesthesia	-	SMD **1.4 SD lower** (2.72 lower to 0.09 lower)	-	240 (2 RCTs)	⨁⨁⨁◯ MODERATE	Educational interventions probably improve paediatric behaviours at the induction of anaesthesia. Downgraded to moderate certainty for serious imprecision, inconsistency and publication bias.
Behaviour - Postoperative period	-	SMD **0.12 SD higher** (0.84 lower to 1.09 higher)	-	172 (2 RCTs)	⨁◯◯◯ VERY LOW [a]	We are uncertain if family-centred educational interventions reduce/increase children and adolescents' postoperative maladaptive behaviours.
Pain - Postoperative period	-	SMD **0.43 SD lower** (1.05 lower to 0.19 higher)	-	599 (4 RCTs)	⨁◯◯◯ VERY LOW	We are uncertain if family-centred educational interventions reduce postoperative paediatric pain intensity.

Effects of educational interventions on parental anxiety in the perioperative period

Patient or population: Parents of children and adolescents (from three to 19 years old) undergoing elective surgery
Setting: Hospital
Intervention: Educational interventions
Comparison: Standard care/comparator

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care/comparator	Risk with educational interventions				
Anxiety - Preoperative period	-	SMD **0.94 SD lower** (2.87 lower to 0.99 higher)	-	361 (6 RCTs)	⨁⨁⨁◯ MODERATE	Family-centred educational interventions probably lead to a reduction in parental anxiety levels preoperatively. Downgraded to moderate certainty for serious imprecision and inconsistency.
Anxiety - Induction of anaesthesia	-	SMD **0.55 SD lower** (1.78 lower to 0.67 higher)	-	376 (3 RCTs)	⨁◯◯◯ VERY LOW [a]	We are uncertain if family-centred educational interventions reduce parental anxiety levels at the induction of anaesthesia.
Anxiety - Postoperative period	-	SMD **1.64 SD lower** (3.05 lower to 0.23 lower)	-	203 (3 RCTs)	⨁⨁⨁◯ MODERATE	Family-centred educational interventions probably lead to a reduction in parental anxiety levels postoperatively. Downgraded to moderate certainty for serious imprecision and inconsistency.

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **SMD:** Standardised mean difference

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

a. Included studies with low number of participants. Different measurement instruments and diverse range of educational materials have been used.

Introduction

Millions of children and adolescents undergo surgery each year[1]. Nearly 50 to 75% of them experience fear and anxiety during the perioperative period[2], feelings also reported as very common in their parents[3-5]. The perioperative period comprises the preoperative, intraoperative, and postoperative periods[6,7]. Children are particularly vulnerable to the stress and anxiety surrounding surgery due to their cognitive development, experience and knowledge about health care.[8] The parental fear, anxiety and trauma are mirrored by their need for comprehensive information, advice, and strategies for coping with their child's perioperative period[5]. Higher anxiety levels have been found in mothers[9], younger parents, parents of younger children, and parents whose children were undergoing their first surgery[10].

High anxiety levels in children have been associated with a multitude of adverse outcomes postoperatively[1,11,12], namely increased pain and necessity of higher analgesia doses and regressive behavioural disorders[13], such as nightmares, enuresis, separation anxiety, eating and emotional problems[14,15]. Ultimately, the former can lead to a regression on previously gained developmental milestones such as loss of bladder control and language abilities[16], especially in younger children[15]. Parental anxiety influences how the child will respond emotionally and physically[17] to the stress of surgery[18]. It has been linked with increased anxiety levels in children[19-21] and postoperative maladaptive behavioural changes in their children[14]. Therefore, effective management of anxiety is essential[1].

Proposed mechanisms for anxiety reduction comprise pharmacological and non-pharmacological strategies[12,22]. The first includes the administration of anxiolytic premedication[23] preoperatively. Although beneficial[24,25], it has its side effects, and it has been associated with increased hospital costs due to extended stays in recovery areas[11] and delays entering the operating theatre[2,26]. Non-pharmacological strategies encompass the adoption of educational, behavioural/psychological[12,22], including the parental presence during induction of anaesthesia[27], and complementary and alternative medicine interventions[12].

Preoperative preparations based on educational interventions are an important component of the surgical process[28]. These are cost-effective, non-invasive and carry a low risk for adverse effects[12]. Family involvement is critical, as parents are a primary source of strength and support[29] and the ones who know their child best. Thus, parents play an important role as information providers to their children and are considered the ones they can rely on for information[30,31]. Therefore, their active involvement in the care provided can positively affect their health outcomes, satisfaction and lower hospital costs[32,33]. A family-centred care approach should be adopted when preparing the dyad for the surgery in order to optimize their outcomes[33].

Providing children, adolescents and parents with information about the upcoming surgery, particularly regarding the expected pre and postoperative period, the signs and symptoms that result from the surgical intervention, helps them manage realistic expectations about the perioperative course[31,34]. It also supports the family in developing adaptive coping mechanisms, minimizing their anxiety, and promoting faster recovery of their children[2,12]. In addition, detailed, developmentally appropriate[34] and specific preprocedural information, such as how long the procedure will take, what will happen, who will be there and the surgical environment, helps children develop a realistic representation[35] of the surgery's day, and consequently, increase their cooperation throughout the perioperative period[34]. Moreover, it can affect the family's knowledge, attitudes and satisfaction[36], transforming a potentially stressful and negative experience into a formative and empowering one[37].

Information provided to the family in the perioperative period can take different forms: verbal, written, or both. Books, pamphlets, guides, teaching programs or sessions (whether face-to-face, via web or audio), games for children, videos, and DVDs are examples of active materials used when delivering educational interventions[34,38-40].

The timing of delivery of educational interventions is also an imperative factor to take into consideration. Research suggests at least five days in advance for school-aged children and adolescents, whereas a shorter timeframe is more beneficial for younger children[12,30,34].

Interventions to manage preoperative anxiety have been previously investigated[37,39,41-44]. However, many of these interventions have been tailored and targeted at children and did not involve the family. Moreover, some have focused on exclusively controlling the preoperative children's anxiety based on behavioural changes. Although two systematic reviews on the topic have explored the impact of technology-based[39,43] preparation programs on children's and parents' anxiety, there is still the need to summarise the evidence about the effectiveness of educational interventions delivered in a family centred approach in the perioperative period for both, children and parents.

A preliminary search of PROSPERO, MEDLINE, CINAHAL, the Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis* was conducted on March 5th 2021, and no current or underway systematic reviews on the topic were identified.

The objective of this systematic review is to evaluate the effectiveness of family-centred educational interventions in the anxiety, pain, and behaviours of children/adolescents (three to 19 years old) and their parents' anxiety in the perioperative period. This review did not involve primary research and therefore ethical approval was not required.

Review questions

i) What is the effectiveness of family-centred educational interventions in the anxiety, pain, and behaviours of children and adolescents (three to 19 years old) in the perioperative period?

ii) What is the effectiveness of family-centred educational interventions in parents' anxiety in the perioperative period?

Methods

Design

This systematic review was conducted in accordance with Joanna Briggs Institute (JBI) methodology for systematic reviews of effectiveness[45] and reported using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement[46]. This review has been registered in PROSPERO (CDR42020211574) and conducted in accordance with the *a priori* protocol[47].

Eligibility criteria

The population of interest were parents and their children/adolescents aged between three and 19 years old, undergoing elective or scheduled surgery under general anaesthesia, regardless of the type of surgery. Parent refers to the relative or 'caregiver', the person responsible for the child. Regarding the children/adolescents' age, the lower age limit was set as children from three years of age can understand simple language, are able to communicate autonomously, and benefit from therapeutic play[48].

Studies were required to have evaluated family-centred educational interventions performed with children/adolescents and their parents in the perioperative period. These could include any printed, written materials such as books, booklets, or guides; teaching sessions or programs, whether face-to-face, via the web or audio; games, videos, or DVDs. There were no limitations to the mode of delivery, frequency, dose, or who delivers the intervention.

All family-centred educational interventions that aimed to manage the study outcomes, either applied as a single educational intervention or as a multi-component educational program (more than one of the interventions reported above), were included. Outcomes included the pain, anxiety, and behaviours in children/adolescents (such as compliance at induction of anaesthesia, sleep and emotional disorders postoperatively) and anxiety in

parents.

Experimental and quasi-experimental study designs including randomised controlled trials, non-randomised controlled trials and before and after studies published in Portuguese, English or Spanish were included in this review.

Search strategy and study selection

The three-step search strategy was undertaken and aimed to find both published and unpublished studies. First, an initial limited search of MEDLINE (PubMed) and CINAHL (EBSCOhost) was undertaken, followed by an analysis of the text words in the title and abstract and the index terms used to describe the articles. The search strategy, including all identified keywords and index terms, was adapted for each included information source and a second search was undertaken between the 3rd and the 13th of April 2021. The full search strategies are provided in Supplement I. Finally, reference lists of studies were screened for additional studies, namely references of studies included in the systematic review and references of systematic reviews on similar topics.

Studies from January 1st 2007 to April 2021 were included. This data range was chosen as it was in 2007 that the paediatric family-centred surgical preparation became prominent and structured[11].

The searched databases included MEDLINE (via PubMed), CINAHL (via EBSCOhost), PsycINFO (via EBSCOhost), Cochrane Central Register of Controlled Trials (via EBSCOhost), and SciELO. In addition, sources of unpublished studies and grey literature searched included OpenGrey, Open Access Theses and Dissertations, and *Repositório Científico de Acesso Aberto em Portugal* (RCAAP).

Following the search, all identified citations were collated and uploaded into EndNote X9.3 (Clarivate Analytics, PA, USA), and duplicate records were removed. Following a pilot test, titles and abstracts were screened by two independent reviewers (IE, MC) for assessment against the inclusion criteria for the review. Potentially relevant studies were retrieved in full, and their citation details were imported. Authors of papers were contacted to request missing or additional data for clarification, where required. Full-text studies that did not meet the inclusion criteria were excluded, and reasons for their exclusion are provided in Supplement II. Any disagreements that arose between the reviewers were resolved through discussion or with a third reviewer (MPS).

Quality appraisal

Eligible studies were critically appraised by two independent reviewers (IE, MC) at the study level for methodological quality in the review using JBI Critical Appraisal Checklist for Randomised Controlled Trials and JBI Critical Appraisal Checklist for Quasi-Experimental

Studies (non-randomised experimental studies)[45]. All items have three potential responses 'yes', 'unclear' and 'no', with 'yes' scoring 1, and the others 0. Once again, any disagreements between the reviewers were resolved through discussion or with a third reviewer (MPS).

Following the critical appraisal, studies that did not reach a quality threshold (at least seven affirmative indicators for RCTs and six for quasi-experimental studies) were excluded. This decision was based on the reviewers' overall assessment of quality and risk of bias.

Data extraction and synthesis

Data were extracted using a structured form (IE, MC) which included specific information as detailed in Appendix I. When possible, studies were pooled with statistical meta-analysis using Stata Statistical Software version 16.0[49]. To perform meta-analysis, studies whose results were presented as medians and respective interquartile ranges underwent conversion to mean and standard deviation estimates[50]. Effect sizes, expressed as Hedges' standardised final post-intervention mean differences (for continuous data), and their 95% confidence intervals, were calculated for analysis. Given the statistical heterogeneity (I^2>50%)[51] of educational interventions implementation between the included RCTs, and between-study and within-study differences, pooling of the effectiveness of these interventions was carried out using the random-effects model[51].

Considering the low number of studies presenting results of the effects of educational interventions on the outcomes of the family, it was not possible to analyse the effect of each intervention independently. Subgroup analysis was performed to explore potential causes of heterogeneity and how the intervention effect varied according to the number of interventions implemented. Therefore, the authors divided the interventions into two subgroups: one for 'multi-component educational program', in which more than one educational intervention was applied to the family; and another subgroup, 'single educational intervention', in which only one intervention was delivered. The overall effect was also presented. Where there were sufficient data, meta-analysis was performed by outcome, follow-up moment and subgroup.

Sensitivity analyses were conducted to test whether the pooled effect size could be influenced by individual studies. Heterogeneity was assessed statistically using the standard I^2 test. Funnel plots were generated to assess publication bias. Statistical tests for funnel plot asymmetry (Egger test) were performed, where appropriate. A *p*-value of less than 0.05 was considered significant for absence of publication bias[52]. Where meta-analysis was not possible, the findings are presented in a narrative format.

Assessing certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE)[53] approach for grading the certainty of evidence was followed, and a Summary of Findings (SoF) was created using GRADEPro GDT (McMaster University, ON, Canada). The outcomes reported in the SoF include: for children/adolescents, anxiety, pain and behaviours. For parents, the outcome reported is anxiety.

Results

Study identification and inclusion

A total of 85 studies were retrieved for full-text review. Of these, 57 articles were excluded, and reasons are noted in the Supplement II. The study identification is described in detail in Figure 1.

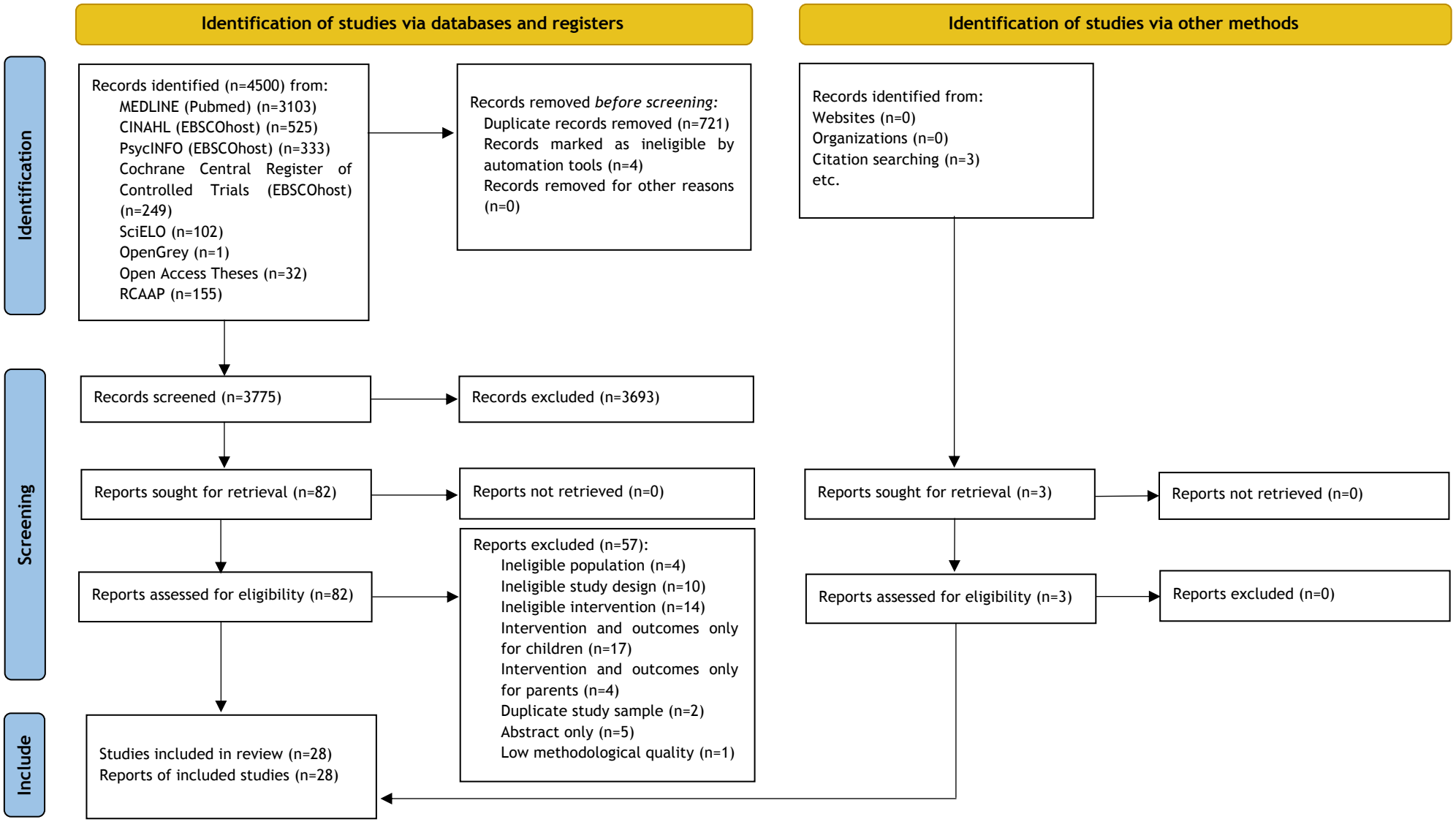


Figure 1 - Search results and study selection and inclusion process[46]

Characteristics of included studies

All included studies in this review were written in English and published between 2007 and 2021. Studies were conducted in hospital settings in Canada[54], Korea[55-58], Turkey[59-62], India[63,64], Iran[65-67], Australia[68], Italy[69], Taiwan[70], Singapore[40], Hong Kong[71], France[72], Belgium[73], Portugal[74,75], Japan[76], Egypt[77], Brazil[78,79] and Netherlands[80].

Sample sizes ranged from 36 to 282 participants per study. The main reasons for 'dropouts' were cancelled surgery[54,57,70,71,76], did not receive the allocated intervention[55,68], the participants were no longer interested[71], and failure to check outcomes' scores/inadequate data[57,65].

The majority of the participants underwent otolaryngologic[40,54,56-58,61,62,65,68,79,80], followed by genitourinary[60,63,71,74-76] and ophthalmic[56-58,68] surgery. Children with previous surgical or post-anaesthetic complication[54], requiring postoperative intensive care[55-58], with cognitive deficits or developmental disabilities[55-63,67-71,73-75,77-80], prior experience of anaesthesia/surgery[55-57,59,60,65,67,68,71,78,79], history of epilepsy or seizure[55-58,77] or chronic disease[60-62,67,70,71,77] have been excluded. Parents/guardians who did not speak the language[54,63,73,74,76,80], unable to complete self-report forms[68] or to accompany their child[70] were also excluded. The demographic and clinical variables did not significantly differ between the experimental and control groups in all studies.

Regarding the timing for the delivery of educational interventions, this was variable from study to study: from two weeks[65] up to a few minutes before surgery[65]. In addition, two studies did not detail when the intervention was applied[54,61]. The duration of the educational interventions ranged from 4 minutes[55,57] to one hour[40]. Modes of delivery included face-to-face contact with the family or in a group setting[63,71] (more than one family) at the hospital; or, at home, tailored for the participation of the dyad, child or caregiver. All studies evaluated the interventions with direct contact with the participants. Finally, follow-up duration varied from a minimum of simply the inpatient duration (from hospital admission to discharge) up to two weeks postoperatively.

Conflicts of interest were disclosed as some authors have been involved in the development of the educational material[59,73] and 14 studies were funded by local[54,66,68-71] and national institutions[40,54,56,72,74,75], and industry (IONIX Ltd.)[55,57,58].

Educational interventions

The educational interventions focused on systematic explanations about pre and postoperative care[60,61,63,65,72,77-79] (i.e., preoperative fasting time, personal hygiene, control of vital signs, anaesthesia, use of analgesic drugs to relieve pain postoperatively), including how to prepare a child for surgery[60-62,72,73,76], types of anaesthesia[63,78,79], potential reactions

of children waking up after surgery[54,78,79], postoperative pain management[40,70,73] and strategies that parents/caregivers could use to support their child in the postoperative period[54,65]. Additionally, some interventions aimed to facilitate the children's adaptation to the operating room environment[40,63,64,67-71,77], adaptation to the operating room environment through virtual reality[55-58,80], the preoperative processes they need to undergo after admission[40,57,59-62,66,68,71-76,80], and their knowledge on the equipment most commonly used[40,56-59, 62,65,67,69-71,74,77,80]. Besides, they have provided parents with knowledge about the equipment and procedures in the recovery room, and the roles of nurses and parents in supporting their child[54,78,79]. In many studies, children and their parents were encouraged to ask questions about the preoperative procedures[55-58,60,69,71].

Among the materials used to support the educational interventions were DVDs[54,65], videos[40,55,57,58,62,63,69,70,74,76,80], booklets[40,59,60,66,74,76], leaflets[64,72,78,79], books[60,61], one-hour face-to-face teaching[40], verbal information[60], therapeutic play[59,65,67,71,77], demonstration of equipment using peer modelling approach[68], familiarization with equipment[70], tour visits[59,66-68,70,77], photo files[64,68], and games[56,73-75]. Nine studies were preoperative programs[40,59,60,64,65,67,68,70,77] that encompassed the use of more than one material. Only one study[55] reported dizziness associated with the delivery of the intervention in one participant (child).

Comparators

The comparators used in the studies were standard preoperative care (without intervention)[40,54-57,59,60,62-64,66-73,75,77-80], intervention with non-educative materials[61], multi-component preparation programs with more than one intervention and materials used vs. comparator groups (with one educational intervention)[65], the non-involvement of the family[58], absence of auxiliary materials when delivering the educational intervention[74], the intervention's frequency of delivery[76].

Outcomes

Children/Adolescents' Anxiety

Regarding the outcomes and its assessment tools, the preoperative anxiety in children/adolescents was assessed using the Visual Analogue Scale for anxiety (VAS-a)[73, 80], FACES Rating Scale[76], the State-Trait Anxiety Inventory for Children (STAIC)[59,64,66,72,77], the State-Trait Inventory form Y (STAI-Y)[75], the modified Yale Preoperative Anxiety Scale (m-YPAS)[56-58,61,62,67-69,79,80)], the Hamilton Anxiety Rating Scale (HAM-A)[63], the Chinese version of the State Anxiety Scale for Children (CSAS-C)[71], and the Spielberger State Anxiety Scale for Children (SSAS-c)[67]. These instruments were measured either by the child[59,64-67,72,73,76,80] (self-reported), the parents[73] or by the study assessors[55-58,61,62,68,69,71,78-80] at home (post-

intervention)[73], day before surgery[59,64,77], surgery's day[56-58,63,66,67,69,71-73,75], holding area[55,61,67,79,80], while entering the operating room[61,67] and at the induction of anaesthesia[62,79,80]. Additionally, some studies assessed the anxiety postoperatively[59,64,71].

Seventeen studies[56,58-59,61,63-64,66-69,71-73,76-78,80] intended to investigate whether the preoperative post-intervention anxiety levels differed from participants undergoing educational interventions from those undergoing standard care. Fourteen studies[56,58,63,66-69,71-73,75-78] found positive effects of educational interventions on reducing children's preoperative anxiety, ten of which with statistical differences between groups ($p \leq 0.05$)[56,58,63,67,69,71,72,75-77].

At induction of anaesthesia, authors of five[55,57,61,62,78] out of seven studies[55,57,61,62,78-80], reported lower anxiety levels in the participants who received educational interventions preoperatively, with statistical differences between groups.

Six[59,64,68,71,76,80] studies evaluated postoperative anxiety levels in children and adolescents, four[64,71,76,80] of which reporting lower anxiety levels in the experimental groups.

Parental anxiety

The parental anxiety was self-reported[54,58-61,63,64,66,68,70,72-78,80], and observed[80] using predominantly the State-Trait Inventory (STAI)[60,61,64,66,68,72,74,76,77,80], the Amsterdam Preoperative Anxiety and Information Scale[70], the Visual Analogue Scale for Anxiety (VAS-a)[54,80], the 101 Numeric Rating Scale[58], the Hamilton Anxiety Rating Scale (HAM-A)[63,67,78], and the Beck Anxiety Inventory (BAI)[59]. These instruments were used pre[58-61,63,64,66,67,77,80] and postoperatively[54,59,60,64]. Parents in the experimental group showed less anxiety before surgery than the ones in the control group[60,63,66,68,75-78]. Two studies did not find significant differences between groups[64,66]. Postoperatively, similar results were found among four studies[54,59,60,64].

Children/Adolescents' behaviours

In order to assess children's behaviours during stressful medical events like a surgery, blinded observers have applied the Children's Emotional Manifestation Scale (CMES)[70,71] and the Procedural Behaviour Rating Scale (PBRS)[55,56]. Preoperative behaviour scores in the experimental group were three points lower than those in the control group, with children exhibiting fewer emotions at induction of anaesthesia[70,71]. Also, three[55,56,77] of four studies[55,56,58,77] reported better compliance of participants in the experimental group, with statistical significance between groups. The children's compliance during induction of anaesthesia was observer-rated using the Induction Compliance Checklist (ICC)[55,56,58,77]. High

scores indicate poor behavioural compliance, whereas lower scores indicate good compliance.

The incidence of emergency delirium in children undergoing elective surgery was determined by the Paediatric Anaesthesia Emergence Delirium score (PAED)[57,70,80] and the Scoring System for emergence Delirium[68]. Among the studies, no differences were found between groups in the incidence of emergence delirium symptoms upon arrival at the recovery room or at 15 minutes post-arrival[56,70,80].

Postoperative behavioural disturbances such as difficulty getting to sleep, nocturnal enuresis, fear of the dark, object to go to bed at night and decreased appetite have been investigated and assessed in five studies through the Post-Hospitalization Behavioural Questionnaire[55,68,70,73,77]. Children with high anxiety levels at induction of anaesthesia[62] reported higher ratios of postoperative behaviours one week after surgery. One study[77] reported more problems falling asleep, staying asleep and waking up crying in the control group as compared with children in the experimental group. The remaining studies[68,70,73] did not find significant differences between groups but reported a higher incidence of these behaviours in those who received the educational interventions preoperatively.

Children/Adolescents' postoperative pain

Eight studies[40,54,64,65,68,71,73,80] explored whether the postoperative pain scores differed from participants undergoing educational interventions from those undergoing standard care. Five found lower preoperative pain scores in the experimental group at the recovery room[65] and postoperatively[54,64,65,68,71]. From these, three have shown statistical differences between groups ($p \leq 0.05$)[54,64,68]. Only one study[73] has reported a significant correlation between anxiety levels and pain one week postoperatively (r=0.512; p=0.00).

Children's postoperative pain[40,54,64,65,68,71,73,80] was measured using the Visual Analogue Scale (VAS-p)[65,71], Wong-Baker Scale[64], the revised Faces Pain Scale (FPS-r)[68,80], the FLACC[68,80], the Numeric Rating Scale[40], and the Modified Children's Hospital of Eastern Ontario Pain Score (mCHEOPS)[54]. These reliable and validated instruments were self-assessed by the child[71,73,80], parents[40,73,80] or assessors of the study[54,65,68,80], at different time points: at the recovery room[54,65,80], at the day-care surgery unit after recovery[54,64], or up to 2 weeks postoperatively[40,65]. One study[71] did not detail when the postoperative pain was assessed.

Quality appraisal

The current systematic review included 28 studies, 26 randomised controlled-trials (RCTs) and two quasi-experimental studies (*Quasi*-RCTs). All the included RCTs answered 'yes' to eight (Q1, Q3, Q7, Q9-Q13) of 13 checklist quality criteria (Table 1). The two *Quasi*-RCTs answered 'yes' to all checklist criteria (Table 2). This assessment identified potential methodological weaknesses and sources of bias in the review. First, only one[76] RCT provided information on participants' blinding to treatment assignment, whereas the remaining studies, due to the nature of the intervention, failed to ensure or provide information about this criterion. Similarly, studies have failed to guarantee that those delivering treatment[55,56,59-63,65-72,74,75,78,79] and assessing the outcomes[59,60,63,64,66,69,70,72-76,78,79] were blind to treatment assignment. This could be explained by the complexity of concealing group allocation, both from participants and those delivering the treatment when specific interventions such as educational interventions are being used. Also, authors of one study argued the impossibility of organising blinding of outcome assessment due to the lack of funding[72].

Table 1 - Critical appraisal results of eligible studies (RCTs).

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Chartrand et al., 2017[54]	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ryu et al, 2019[57]	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ryu et al, 2018[56]	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Coskunturk et al, 2017[59]	Y	Y	Y	N	U	U	Y	Y	Y	Y	Y	Y	Y
Park et al, 2019[58]	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Yadav et al, 2020[63]	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Faramarzi et al, 2020[65]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Fincher et al, 2012[68]	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Liguori et al, 2016[69]	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Lin et al, 2019[70]	Y	Y	Y	N	U	U	Y	Y	Y	Y	Y	Y	Y
Zhu et al, 2018[40]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Li et al, 2007[71]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Kassai et al, 2016[72]	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Aydin et al, 2021[61]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Matthyssens et al, 2020[73]	Y	Y	Y	N	Y	U	Y	Y	Y	Y	Y	Y	Y
Tabrizi et al, 2015[66]	Y	Y	Y	U	U	U	Y	N	Y	Y	Y	Y	Y
Batuman et al, 2015[62]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Fernandes et al, 2014[74]	Y	N	Y	N	U	U	Y	Y	Y	Y	Y	Y	Y
Ryu et al, 2017[55]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Wakimizu et al, 2009[76]	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	Y

Study *(cont.)*	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**	**Q13**
Vaezzadeh et al, 2011[67]	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	Y	Y
Cumino et al, 2013[78]	Y	Y	Y	U	U	U	Y	Y	Y	Y	Y	Y	Y
Kumar et al, 2019[64]	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Cumino et al, 2017[79]	Y	Y	Y	N	U	U	Y	Y	Y	Y	Y	Y	Y
Fernandes et al, 2015[75]	Y	Y	Y	U	U	U	Y	Y	Y	Y	Y	Y	Y
Eijlers et al, 2019[80]	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total %	**100**	**96**	**100**	**3**	**23**	**46**	**100**	**96**	**100**	**100**	**100**	**100**	**100**

Y = Yes, N = No, U = Unclear; JBI critical appraisal checklist for randomized controlled trials: Q1 = Was true randomization used for assignment of participants to treatment groups? Q2 = Was allocation to treatment groups concealed? Q3 = Were treatment groups similar at baseline? Q4 = Were participants blind to treatment assignment? Q5 = Were those delivering treatment blind to treatment assignment? Q6 = Were outcome assessors blind to treatment assignment? Q7 = Were treatment groups treated identically other than the intervention of interest? Q8 = Was follow-up complete, and if not, were strategies to address incomplete follow-up utilized? Q9 = Were participants analysed in the groups to which they were randomized? Q10 = Were outcomes measured in the same way for treatment groups? Q11 = Were outcomes measured in a reliable way? Q12 = Was appropriate statistical analysis used? Q13 = Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?

Table 2 - Critical appraisal results of eligible studies (*Quasi*-RCTs).

Study	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**
Bartik et al, 2018[60]	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sabaq et al, 2012[77]	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

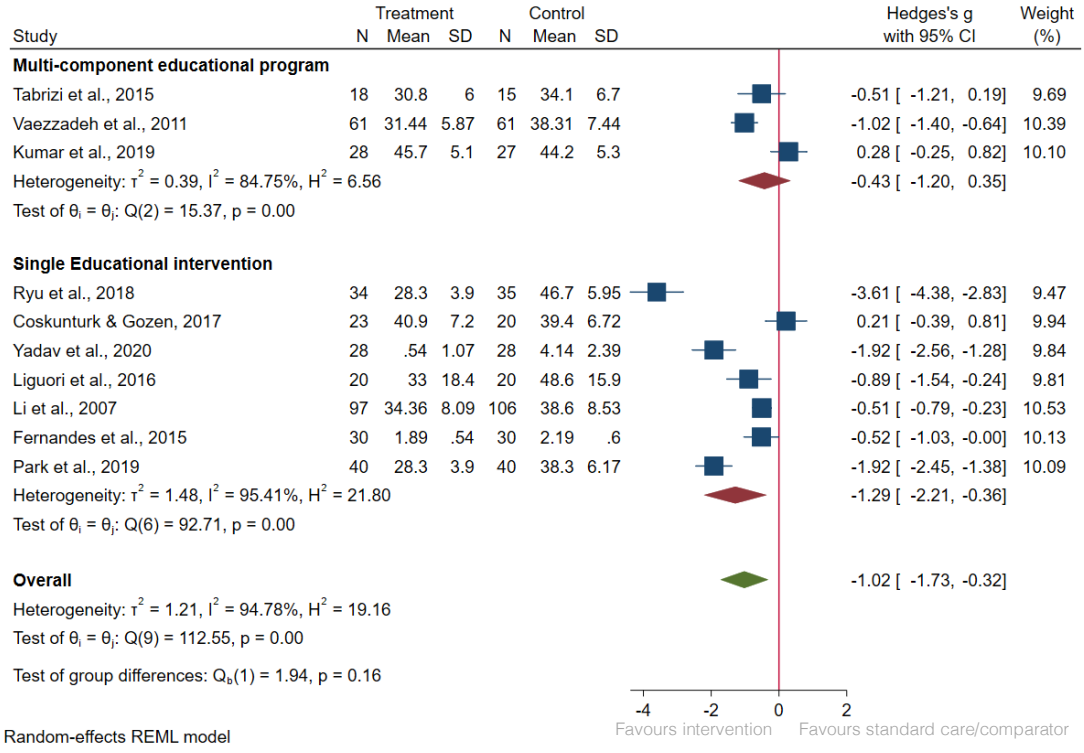
Y = Yes, N = No, U = Unclear; JBI critical appraisal checklist for quasi-experimental studies: Q1 = Is it clear in the study what is the 'cause' and what is the 'effect' (i.e., there is no confusion about which variable comes first)? Q2 = Were the participants included in any comparisons similar? Q3 = Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest Q4 = Was there a control group? Q5 = Were there multiple measurements of the outcome both pre and post the intervention/exposure? Q6 = Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed? Q7 = Were the outcomes of participants included in any comparisons measured in the same way? Q8 = Were outcomes measured in a reliable way? Q9 = Was appropriate analysis used?

Even though the authors have conducted the appropriate statistical analysis, five studies[70,72-74,76] did not report sufficient data to perform meta-analysis in any outcome. Moreover, meta-analysis of *Quasi*-RCTs was not performed. Therefore, these results as well as the results from all *Quasi*-RCTs[60,77] are presented in a narrative format.

Review findings

Effect of family-centred educational interventions on children and adolescents' anxiety

Pooled analysis of 10 RCTs[56,58,59,63,64,66,67,69,71,75] involving 761 participants favoured the implementation of educational interventions (Figure 2). Moderate-certainty evidence indicates that educational interventions probably lead to a large reduction in preoperative paediatric anxiety levels (SMD=−1.02; SE=0.36; 95% CI [−1.73;−0.32]; p=0.02). In addition, children and adolescents who participated in a 'Single Educational Intervention' expressed lower anxiety scores than children enrolled in a 'Multi-component Educational Program' (SMD_{SEI}=−1.29; SE=0.48; p=0.04; $SMD_{M\text{-}CEP}$=−0.43; SE=0.40; p=0.39).



M-CEP – Multi-component Educational Program; SEI – Single Educational Intervention

Figure 2 - Preoperative anxiety in children and adolescents: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled subgroup analysis (random-effects model) of the Multi-Component Educational Programs and Single Educational Intervention's studies.

However, there was high statistical heterogeneity across the individual studies of both subgroups (I^2=84.75% and I^2=95.41%, respectively). Publication bias was apparent from the funnel plot and Egger's test (p=0.58) (Figure 3). Sensitivity analysis was performed by excluding the lowest quality study score[66] ($SMD_{M\text{-}CEP}$=−0.38; SE=0.65; p=0.63; I^2=95.1%; $SMD_{overall}$=−1.08; SE=0.40; p=0.028; I^2=95.50%); and the study that used a different comparator[58] ($SMD_{overall}$=−0.92; SE=0.39; p=0.047; I^2=95.00%). The result did not change significantly.

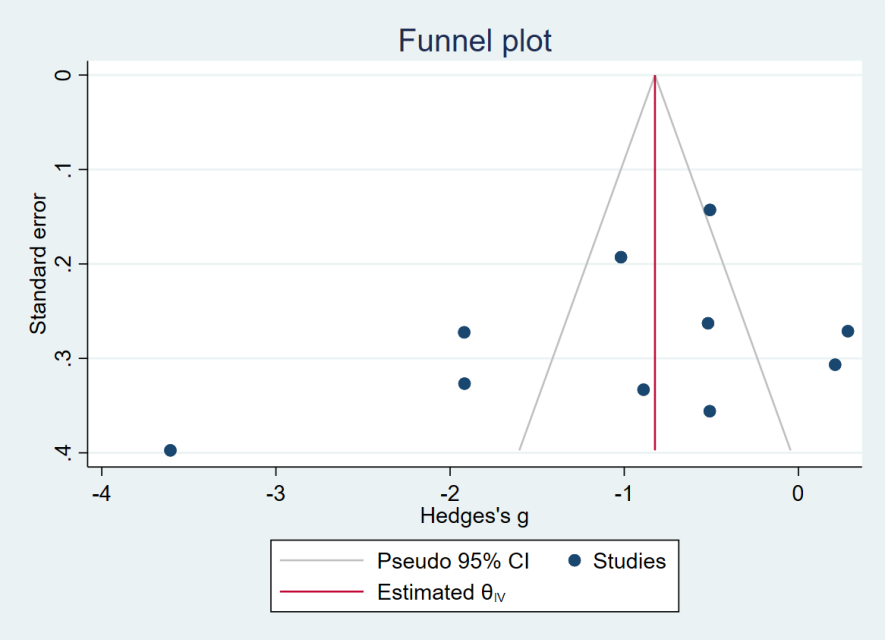


Figure 3 - Preoperative children and adolescents' anxiety: Funnel plot of all studies.

In this review, we have considered the induction of anaesthesia in all studies that reported paediatric anxiety from the holding area up to entering the operating theatre. Pooled analysis of seven RCTs[55,57,61,62,78-80] including 598 participants favoured the use of educational interventions. Moderate-certainty evidence indicates that educational interventions probably lead to a large in paediatric anxiety scores at induction of anaesthesia (SMD=−1.54; SE=0.62; 95% CI [−2.72;−0.36]; p=0.046; I^2=97.52%; Egger's test = 0.009) (Figure 4).

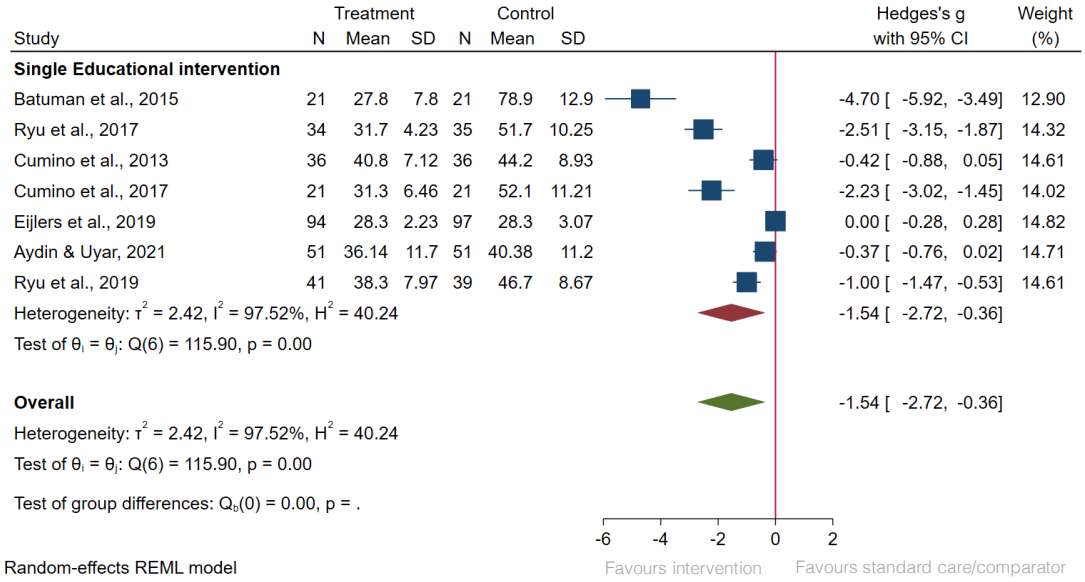


Figure 4 - Children and adolescents' anxiety at the induction of anaesthesia: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled analysis (random-effects model) of the Single Educational Interventions' studies.

Postoperatively, even though four studies[59,64,68,71] have investigated children/adolescents' anxiety, only three RCTs[59,64,71], with 301 participants, were included for meta-analysis. Moderate-certainty evidence indicates that educational interventions probably reduce largely postoperative anxiety scores (SMD=−2.33; SE=0.98; 95% CI [−4.25; −0.40]; p=0.14; I^2=95.92%) (Figure 5).

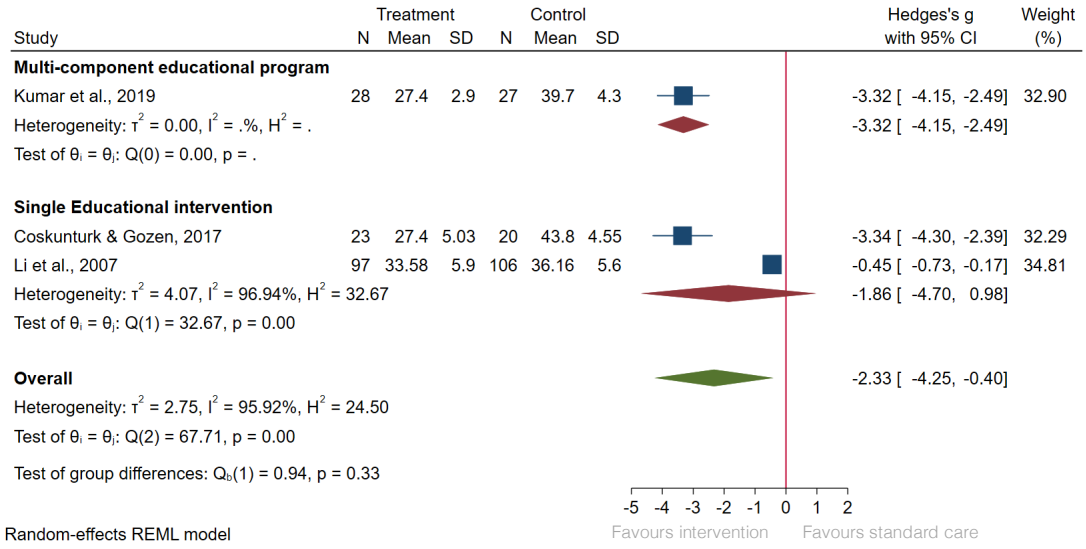


Figure 5 - Postoperative children and adolescents' anxiety: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled analysis (random-effects model) of the Multi-component Educational Program and Single Educational Intervention's studies.

According to the results of Egger's test, supported by the funnel plot, there was publication bias in this outcome (p=0.18; Table 3).

Table 3 - Postoperative children and adolescents' anxiety: Egger's Regression-Based Test.

						95% Confidence Interval	
	Parameter	**Coefficient**	**Std. Error**	**t**	**Sig. (2-tailed)**	**Lower**	**Upper**
Overall	(Intercept)	0.86	0.25	3.39	.18	−2.36	4.08
	SE[c]	−9.22	1.13	−8.19	.08	−23.52	5.09

Random effects meta-regression with the Truncated Knapp-Hartung SE adjustment
c. Standard error of effect size

Effect of family-centred educational interventions on children and adolescents' behaviour

At the induction of anaesthesia, pooled analysis of two studies[56,71], with a total sample size of 272 children, favoured the use of educational interventions (SMD=−1.40; SE=0.67; 95% CI [−2.72;−0.09]; p=0.28; I^2=93.75%) (Figure 6). Moderate-certainty evidence indicates that educational interventions probably lead to a large improvement of paediatric behaviour at this time point.

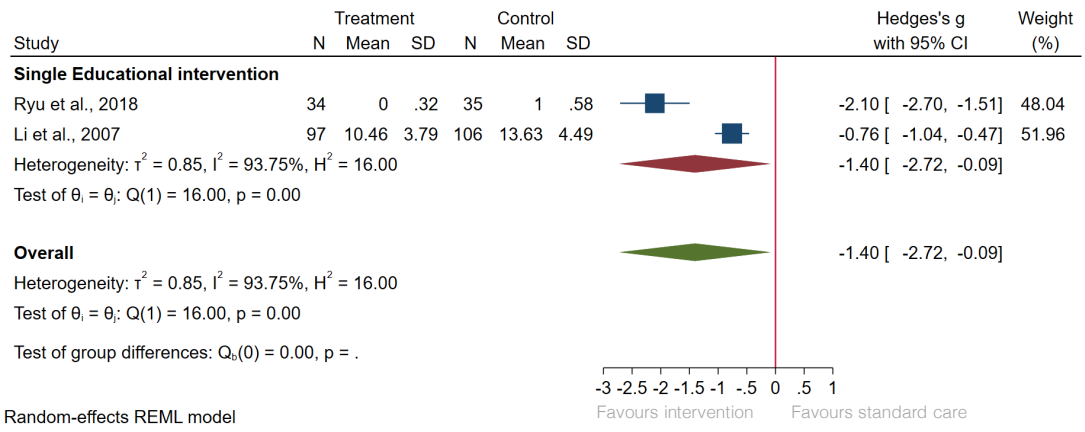


Figure 6 – Children and adolescents' behaviour at induction of anaesthesia: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled analysis (random-effects model) of Single Educational Interventions' studies.

Two RCTs[54,68] of 172 children and adolescents were included for meta-analysis to assess the effectiveness of educational interventions on children and adolescents' postoperative maladaptive behaviours. The findings showed a slightly higher incidence of postoperative behaviours in the educational groups than in the control groups (SMD=0.12; SE=0.15; 95% CI [−0.84; 1.09]; p=0.56; I^2=100%) (Figure 7). However, the shallow quality of the evidence does not allow us to state if educational interventions either improve or exacerbate postoperative behavioural disturbances.

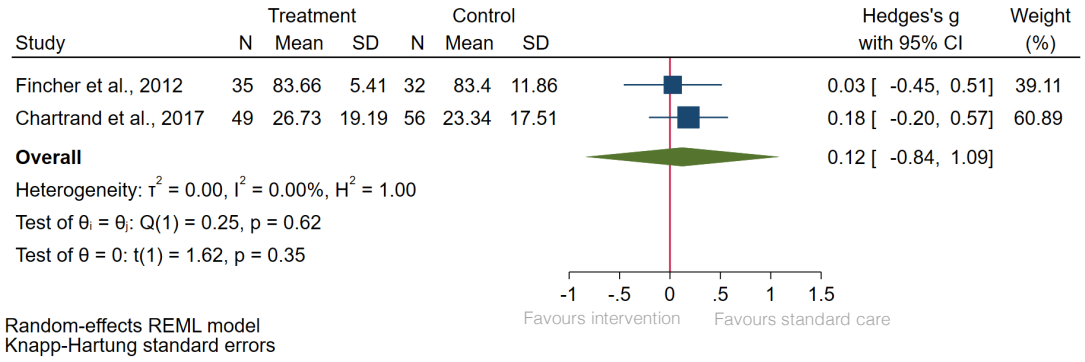


Figure 7 – Children and adolescents' behaviour postoperatively: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled analysis (random-effects model) of the Single Educational Interventions' studies.

Effect of family-centred educational interventions on children and adolescents' pain

Four RCTs[40,64,65,71] were included in the pooled subgroup analysis to examine the impact of educational interventions on children's postoperative pain, with a total sample size of 599 participants (Figure 8). Overall results suggest nonsignificant differences in postoperative pain scores among participants of both groups (SMD=−0.43; SE=0.33; 95% CI [−1.05; 0.19]

p=0.28). In addition, the heterogeneity across the individual studies was high (I^2=92.17%) and publication bias was present (p=0.31, Egger's regression test).

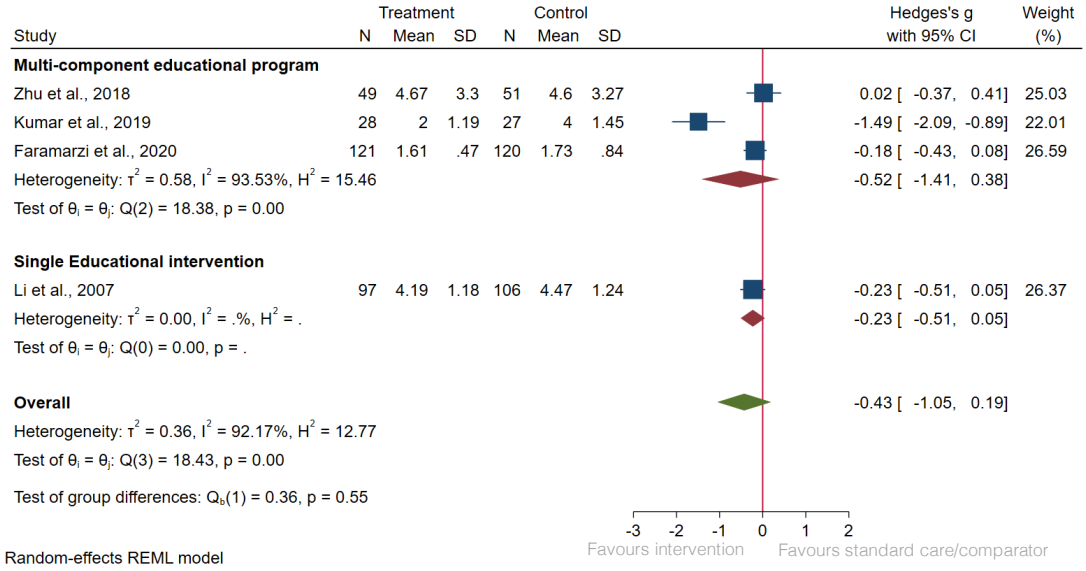


Figure 8 - Postoperative children and adolescents' pain: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled subgroup analysis (random-effects model) of the Multi-component Educational Program and Single Educational Interventions' studies.

Effect of family-centred educational interventions on parental anxiety

A meta-analysis of six RCTs[59,61,63,64,66,78] with 361 parents was performed. Moderate-certainty evidence indicates that educational interventions probably lead to a large reduction in preoperative paediatric anxiety levels (SMD=−0.94; SE=1.00; 95% CI [−2.87; 0.99]; p=0.39; Figure 9).

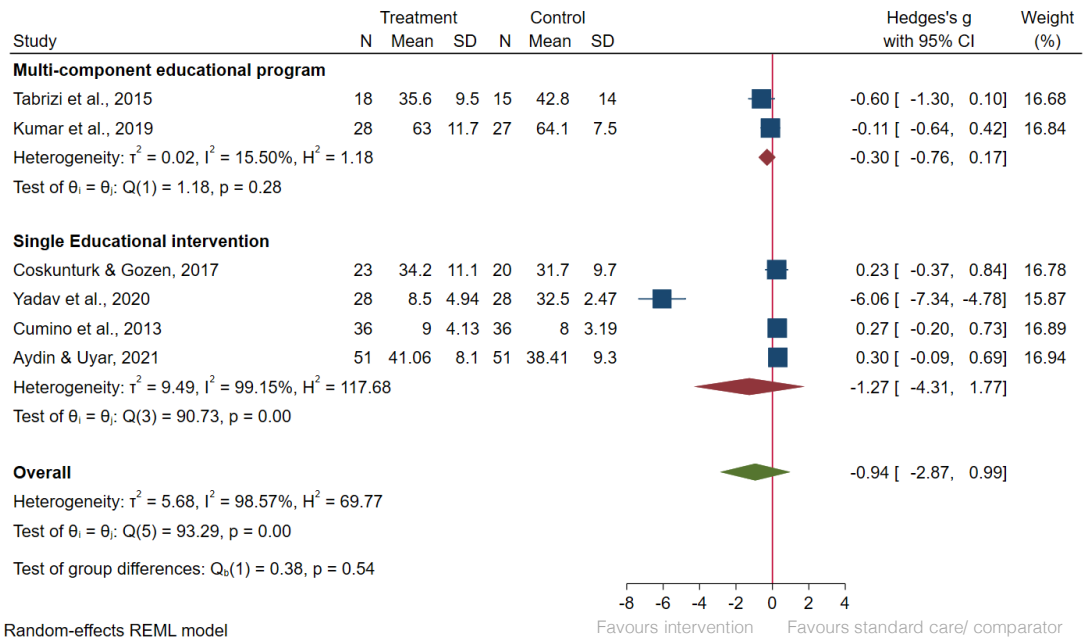


Figure 9 - Preoperative parental anxiety: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled subgroup analysis (random-effects model) of the multi-component educational program and Single Educational Intervention's studies.

Statistical heterogeneity was low in the 'Multi-component Educational Program' subgroup (I^2=15.50%) and substantial in the 'Single-Educational Intervention' (I^2=99.15%). Egger's test was statistically significant for absence of publication bias (p=0.007; Figure 10).

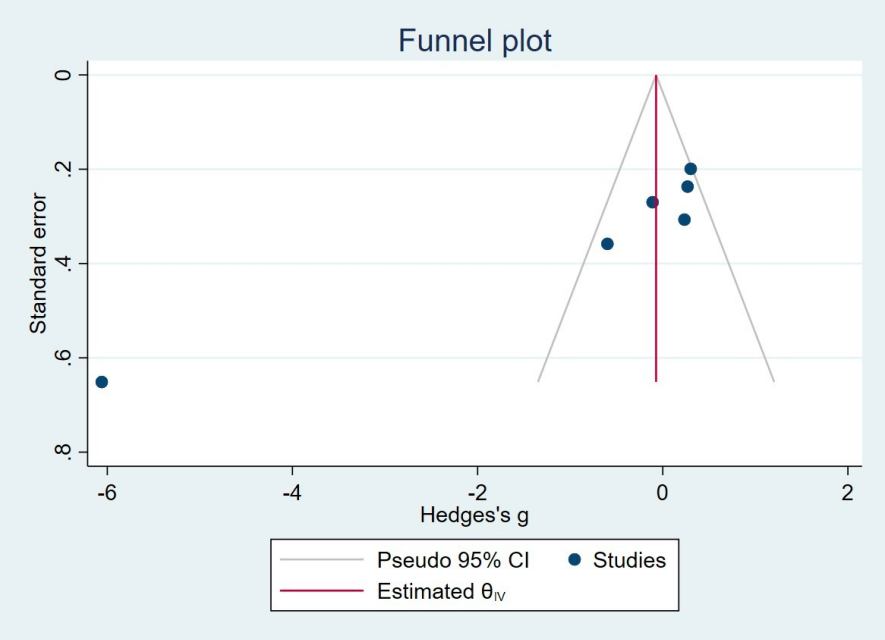


Figure 10 - Preoperative parental anxiety: Funnel plot of all studies.

At the induction of anaesthesia, three RCTs[54,58,80] were included for meta-analysis, with a total sample size of 376 parents (Figure 11). The evidence is very uncertain regarding the

benefits of educational interventions on parental anxiety levels at this time point. In addition, the meta-analysis' results (SMD=−0.55; SE=0.63; p=0.47; I^2=96.69%) were mainly favoured by one study[58], showing the serious inconsistency across the studies. There was publication bias according to the funnel plot and Egger's regression-based test (p=0.24).

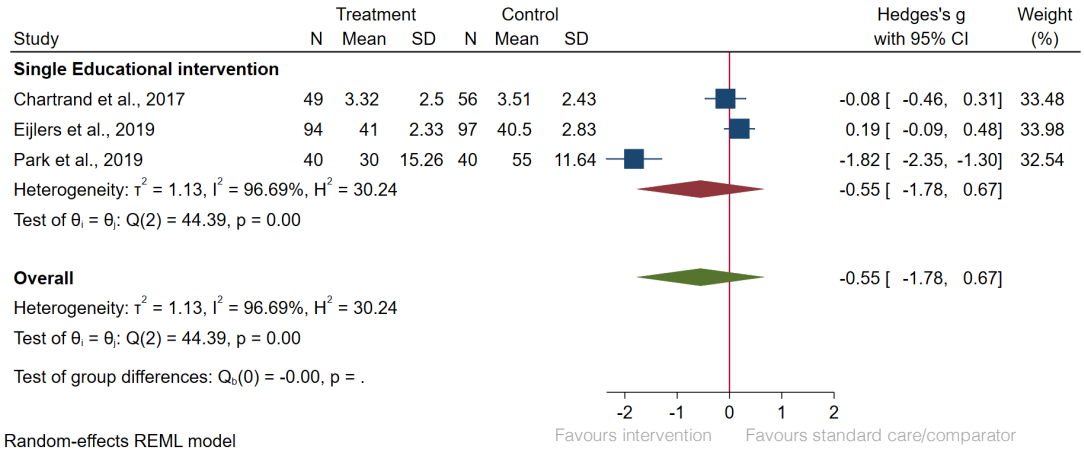


Figure 11 - Parental anxiety at induction of anaesthesia: Forest plot showing effect sizes (Hedges' g)and 95% confidence interval (CI) with a pooled analysis (random-effects model) of the Single Educational Intervention's studies.

A meta-analysis of three RCTs[54,59,64] involving 203 parents evaluated the impact of educational interventions on postoperative parental anxiety (Figure 12). Moderate-certainty evidence indicates that educational interventions probably lead to a large reduction in preoperative paediatric anxiety levels (SMD=−1.64; SE=0.72; 95% CI [−3.05; −0.23]; p=0.15). Nevertheless, the high heterogeneity (I^2=93.75%; Figure 12) and the publication bias (p=0.11; Egger's test) require these results to be carefully interpreted.

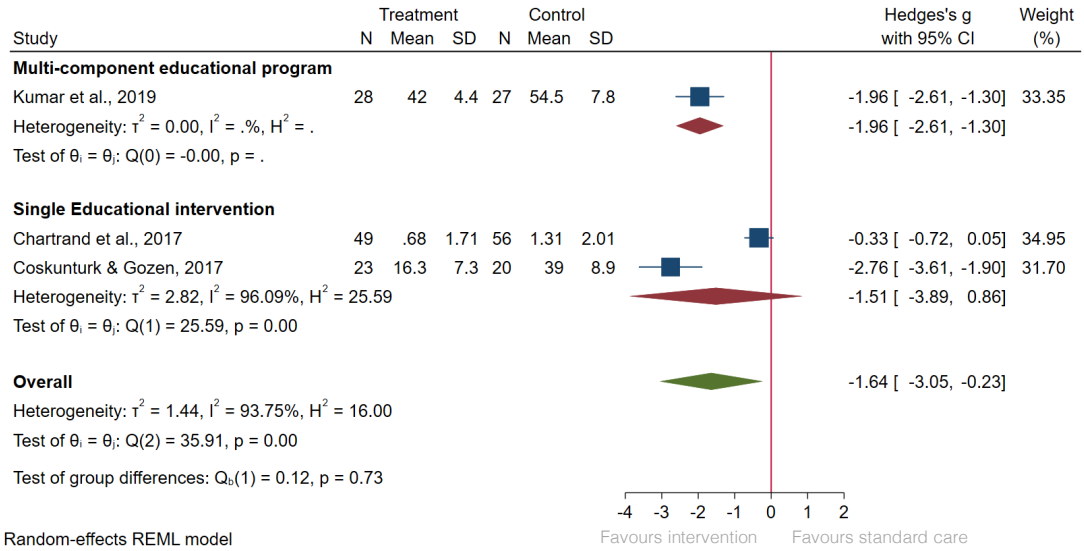


Figure 12 - Postoperative parental anxiety: Forest plot showing effect sizes (Hedges' g) and 95% confidence interval (CI) with a pooled subgroup analysis (random-effects model) of the Multi-Component Educational Program and Single Educational Intervention's studies.

Sensitivity analysis was performed for paediatric and parental anxiety levels in the preoperative period and at the induction of anaesthesia. Studies[58,61,65,74] that used other comparators than standard care were individually excluded; the overall heterogeneity among the studies remained high (I^2>80.00%).

Discussion

This systematic review of 28 studies yielded a meta-analysis of 21 RCTs[40,54-59,61-68,71,75,78-80] with 1872 children and adolescents and 9 RCTs[54,58,59,61,63,64,78,80] with 737 parents over three different outcomes: pain, anxiety and behaviours. To our knowledge, this is the first systematic review presenting an overview of the effect of family-centred educational interventions on children/adolescents and parents' outcomes in the perioperative period.

The results of our meta-analysis suggest that educational interventions can achieve a large reduction in perioperative paediatric anxiety levels, improve paediatric behaviours at the induction of anaesthesia and reduce parental preoperative and postoperative anxiety levels.

We encountered several difficulties gathering information from the included studies to carry out meta-analyses. The high heterogeneity among the studies at different time points is noticeable and should be considered when judgements about the applicability of these findings in the perioperative context are made. For instance, two major challenges might be the subjective nature of these interventions and the small sample size. Furthermore, the included studies used different types of educational interventions, using video resources, video through virtual reality, games, DVD, books, leaflets, and therapeutic play. Finally, although all studies have used validated and reliable tools, the diverse range of measurement instruments employed and the low number of studies included did not allow us to explore each intervention's effectiveness independently. Considering this, a meta-analysis using a random-effects model was performed to provide valuable information to guide perioperative teams in delivering their care.

Educational interventions effectively reduce preoperative anxiety of children and adolescents undergoing elective surgery, with statistical differences between groups. This finding reinforces the conclusion of the narrative synthesis developed by Copanitsanou and collaborators involving preoperative education at the paediatric age[41]. However, the moderate quality of evidence (downgraded for serious imprecision, inconsistency and publication bias) does not allow us to make a conclusive inferences or recommendations for the perioperative practice.

In addition, a systematic review studying the effects of audio-visual interventions[39] on children's anxiety concluded that these effectively reduce children's perioperative anxiety. This finding was supported in the current review, where individual studies in which

multimedia has been used when educating children and adolescents reported a greater effect on preoperative anxiety levels[56,58,69].

In contrast to the findings reported by Kim et al.[43], in which children benefited more from preoperative technology-based preparation programs, in our study, children and adolescents who participated in a single educational intervention expressed lower preoperative anxiety scores than those enrolled in a multi-component educational program. This is possibly related to the family-centredness and educational components of our study.

Insufficient data on the paediatric population from the different studies did not allow us to stratify the results by age (children and adolescents). Although adolescents were included in the eligibility criteria of this review, only three of the 28 included studies had adolescents[40,64,72] in their population sample, hence the need for more primary studies[81].

Additionally, the findings from our review suggest that the implementation of educational interventions may be useful to increase paediatric compliance at induction of anaesthesia, but not in reducing postoperative behavioural disturbances in children and adolescents. With only two relatively small studies, the estimate was not precise enough to determine the direction of effect; therefore, we are uncertain regarding the effectiveness of these interventions on children and adolescents' postoperative maladaptive behaviours. Moreover, educational interventions do not seem to affect the incidence of emergency delirium symptoms in the recovery area.

In our review, children and adolescents benefited from educational interventions to reduce postoperative pain intensity without statistically significant differences. Evidence supports that children and adolescents with higher levels of anxiety prior to surgery tend to exhibit greater intensity of postoperative pain[82]. However, only one study[73] has reported a significant correlation between anxiety levels and pain intensity one week postoperatively.

Regarding parental anxiety, the results from this review suggest that the implementation of educational interventions might provide a valuable alternative to reduce parental anxiety, which concurs with findings from the study conducted by Copanitsanou and collaborators[41]. Multi-component educational programs[64,66], with preoperative visit tours, pamphlets and booklets, were also associated with a greater reduction in preoperative anxiety levels, corroborating the results of the systematic review developed by Kim and collaborators[43].

Strengths and limitations

This systematic review and meta-analysis have multiple strengths, including a wide range of data collection from different databases and studies from various countries, which enhance generalizability to our results. However, we are aware that our research may have several

limitations that contributed to the high heterogeneity of the overall results. We speculate that these limitations were linked with insufficient studies at specific evaluation time points and studied outcomes, small study sample sizes, wide range of participants' age, and differences in measurement instruments across the studies. In addition, no differentiation was made regarding the 'self' of 'observed' assessments. Since we have included studies only written in English, Spanish and Portuguese, language bias was also present. In addition, we must assume as a limitation the lack of the terms 'disorders', 'sleeping' and 'eating' related to the postoperative maladaptive behaviours in our search strategy. Finally, this review did not explore the content and type of methodologies/material used due to the lack of studies.

Conclusions

The findings from this systematic review provide further evidence to improve perioperative practice in paediatric settings, indicating the probable benefits of implementing family-centred educational interventions to reduce perioperative family anxiety and improve paediatric behaviours at induction of anaesthesia. However, the diversity of measurement instruments used among the studies makes performing a meta-analysis and producing more robust data difficult.

Implications for practice

Family-centred education can lead to reduced children/adolescents' and parents' anxiety levels and improved compliance at induction of anaesthesia, in comparison with standard or other preparation methods. Children and adolescents seem to benefit more from single educational interventions, whereas parents demonstrate better health outcomes with multi-component educational programs. Therefore, tailored family-centred education is essential to meet children/adolescents and parents' needs.

Implications for future research

This review has found possible benefits of educational interventions to the family at the different phases of the perioperative period. If further comparative effectiveness trials aim to determine whether or not educational interventions are effective, these should consider a larger sample size. In addition, future studies with adolescents and parents are needed to understand the impact of educational interventions on the management of pain and anxiety in the perioperative period.

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Appendix I: Characteristics of included studies

Author, year **Location** **Setting**	**Study design**	**Participants, age range (Mean)**	**Intervention** **Sample size (n)** ***Time of intervention***	**Comparator/ Control** **Sample size (n)**	**Summary of intervention effect based on authors' results (measure used)**			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Chartrand et al., 2017[54] Canada Hospital	RCT	Children, 3-10Y (5.3Y) Parents	**DVD** 'You and your child in the RR', designed to provide parents with knowledge about the equipment and procedures in the RR, roles of the healthcare professionals and potential reaction of children waking up after general anaesthesia. (n_i=59; n_f=49) Child Ratio F:M (n) (22:27) Parent Ratio F:M (n) (38:11) *Time*: not detailed.	Standard Preoperative care (n_i=64; n_f=56) Child Ratio F:M (n) (19:37) Parent Ratio F:M (n) (47:9)	No significant difference between groups at the Recovery Room. EG M=1.51; SD=1.89 vs. CG M=2.06; SD=2.36; p=0.27. Significantly ↓ pain in the experimental group in the day care surgery unit EG M=0.49; SD=0.84 vs. CG M=1.16; SD=1.59; p=0.02. (Modified Children's Hospital of Eastern Ontario Pain Score – mCHEOPS, observed by assessor)	Not assessed	Postoperative distress is defined as facial, verbal and affective manifestations and motor indicators of emotional distress related to anxiety, anger, fear and pain. No significant difference between groups regarding children's distress. EG M=26.73; SD=19.19 vs. CG M=23.34; SD=17.51; p=0.59. (*Échelle descriptive du comportement de l'enfant opéré* – EDCEO, which includes 6 items)	*T1: immediately before entering the RR; T2: 5min after entering the RR; T3: 5 minutes after leaving the RR with their child.* No significant difference between groups in parents' anxiety at T1, T2 or T3. At T1: EG M=3.32; SD=2.50 vs. CG M=3.51; SD=2.43; t=0.68, p=0.66. At T2: EG M=2.76; SD=2.60 vs. CG M=2.73; SD=2.44, t=0.68, p=0.66. At T3: EG M=0.68; SD=1.71 vs. CG M=1.31; SD=2.01, t=0.68, p=0.66. (VAS, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Ryu et al., 2019[57] Korea Hospital	RCT	Children 4-10Y (6Y) Parents	4-minute virtual reality **video** showing the operating theatre and explaining the perioperative process. (n_i=43; n_f=41) Child Ratio F:M (n) (12:29) *Time*: One hour before surgery	Standard Preoperative care (without intervention). (n_i=43; n_f=39) Child Ratio F:M (n) (18:21)	Not assessed	Reduced preoperative anxiety levels in the experimental group when compared to the control group at the induction of anaesthesia. EG Mdn=38.30[23.30-50.90] vs. CG Mdn=46.70[33.30-63.30], p=0.02. (m-YPAS, observed by blinded assessor)	The incidence of emergence delirium was similar in the two groups (EG n=14 of 41 vs. CG n=16 of 39, p=0.77). PAED score between groups was similar without statistical significance (EG=8.00 [3.50-12.50] vs. CG=8.00 [5.00-12.00], p=0.79). (PAED - Paediatric Anaesthesia Emergence Delirium score) Postoperative day #1: three children in the experimental group reported behavioural disturbance vs. two in the control group. Postoperative day #14: one child in the EG reported behavioural disturbance vs. none in the CG. No significant difference between the two groups on postoperative day #1 (p=0.671) and day #14 (p=0.329). (Post-Hospitalization Behaviour Questionnaire for Ambulatory Surgery – PHBQ-AS, recorded by calling the parents on day 1 and 14 after surgery)	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Ryu et al., 2018[56] Korea Hospital	RCT	Children 4-10Y (5-6Y) Parents	5-minute virtual reality **game** where the player would be given the opportunity to interact and explore the operating theatre environment. (n_i=35; n_f=34) Child Ratio F:M (n) (16:18) *Time*: One hour before surgery.	Standard preoperative care (conventional mode of education) ($n_{i,f}$=35). Child Ratio F:M (n) (13:22)	Not assessed	Pre-anaesthesia reduced anxiety levels in the experimental group when compared to the control group. EG Mdn=28.30 [23.30-36.70] vs. CG Mdn=46.70 [31.70-51.70], p<0.001. (m-YPAS, observed)	No significant differences between groups: EG Mdn=0.00[0.00-1.00] vs.CG Mdn=1.00[0.00-2.00], p=0.09. Procedural Behaviour Rating Scale (PBRS) Better compliance in the experimental group than in the control group (p=0.038). (ICC, observed)	Not assessed
Coskunturk & Gozen, 2017[59] Turkey Hospital	RCT	Children 6-12Y (8-9Y) Mothers	**Preoperative program** 'ITPEP' that included: educational booklet, therapeutic play and a short visit to PICU. ($n_{i,f}$=23) Child Ratio F:M (n) (13:10) *Time*: Day before surgery.	Standard preoperative care (conventional mode of education) ($n_{i,f}$=20). Child Ratio F:M (n) (11:9)	Not assessed	No significant difference between groups on the day before surgery EG M=40.90; SD=7.20 vs. CG M=39.40; SD=6.72; p=0.48. Postoperative anxiety (6h) Significantly reduced levels in the experimental group: EG M=27.40; SD=5.03 vs. CG M=43.80; SD=4.55, p=0.01. (STAI-C, self-reported)	Not assessed	Preoperative parental anxiety (day before surgery): No significant difference between groups. EG M=34.20; SD=11.10 vs. CG M=31.70; SD=9.70; p=0.43. Postoperative parental anxiety (6h postop) Significant difference between groups EG M=16.30; SD=7.30 vs. CG M=39.00; SD=8.90; p=0.01. (The Beck Anxiety Inventory – BAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Park et al., 2019[58] South Korea Hospital	RCT	Children 4-10Y (6-7Y) Parents	Virtual reality tour **video** in which a little Penguin introduces itself and explains the detailed preoperative preparation process to children. Parents watched the same video via mirroring display. ($n_{i,f}$=40) Child Ratio F:M (n) (13:27) *Time*: One hour before surgery.	Children watched the VR-guided tour of the operating theatre. ($n_{i,f}$=40) Child Ratio F:M (n) (20:20)	Not assessed	Significant difference between groups preoperatively. EG Mdn=28.30 [23.30-36.70] vs. CG Mdn=38.30[23.30-44.20]; p=0.03. (m-YPAS Korean Version, observed)	No statistical differences between groups for compliance at induction EG n=30 of 40 vs. CG n=26 of 40 perfect compliance; p=0.72. (ICC, observed)	Parents in the experimental group showed less anxiety (after induction) than the ones in the control group. EG Mdn=30.00[10.00-62.50] vs. CG Mdn=55.00 [40.00-80.00], p=0.03. (101 Numeric Rating Scale, self-reported)
Yadav et al., 2020[63] India Hospital	RCT	Children 6-12Y (8Y)	15-minute **video** 'PES' – Preoperative Educational Schedule. It contained an explanation about pre and postoperative care, operation theatre visit, discussion of common medication, types of anaesthesia and commonly used medical instruments that the child would see in a surgery. ($n_{i,f}$=28) Child Ratio F:M (n) (7:21) Parent Ratio F:M (n) (15:13) *Time*: Evening before surgery.	Standard preoperative care ($n_{i,f}$=28) Child Ratio F:M (n) (10:18) Parent Ratio F:M (n) (10:18)	Not assessed	Reduced post-intervention preoperative anxiety levels (surgery's day, in the morning) in experimental group when compared with control group, with significant differences EG Mdn=0.00[0.00-1.00] vs. CG Mdn=4.00[2.00-6.70], p=0.00. Mean values: EG M=0.54; SD=1.07 vs. CG: M=4.14; SD=2.39. (HAM-A, self-reported)	Not assessed	Anxiety levels in experimental group reduced post-intervention significantly EG Mdn=8.50[2.00-19.00] vs. CG Mdn=32.50[27.25-35.75]; p=0.00. (Hamilton Anxiety Rating Scale, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Faramarzi et al., 2020[65] Iran Hospital	RCT	Children 9-12Y (10Y) Parents	Usual care and the informative booklet + multi-component **preparation program**, which included a DVD with adequate information through an educational tour of the preoperative office, arrival at the surgical ward, equipment used in the operating room and postoperative recommendations; therapeutic play (demonstration of obtaining vital signs and equipment used). (n_i=141; n_f=121) Child Ratio F:M (n) (68:53) *Time*: from 2 weeks until a few minutes before surgery	Usual care and an informative booklet about the anatomy of tonsils, indications and complications of tonsillectomy, recommendations for the postoperative period. (n_i=141; n_f=120). Child Ratio F:M (n) (59:61)	Pain score at PACU, 4 and 8h post operation was not statistically significant between groups. PACU EG M=1.35; SD=0.52 vs. CG: M=1.21; SD=0.81; p=0.11. 4h postoperatively EG M=1.61; SD=0.47 vs. CG: M=1.73; SD=0.84; p=0.17; 8h postoperatively EG M=2.29; SD=0.56 vs. CG: M=2.33; SD=0.92; p=0.68. (VAS, observed)	Not assessed	Not assessed	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Bartik & Toruner, 2018[60] Turkey Hospital (interview room)	Quasi-experi-mental	Children 7-12Y (7-8Y) Caregivers	**Preoperative program**, which included a booklet intitled 'The Care of Your Child in Outpatient Surgery' (how children feel about the procedure, how to prepare a child for surgery, what is brought to the hospital, admission process, monitoring a child after surgery, postoperative nutrition and mobilization, home care), verbal information and telephone counselling for parents. 'The Coloring Book' (colouring pictures, puzzles and games with information for children about pre and postoperative procedures) and information about the surgical process – gown, hat and purpose of wristbands using a medical play doll - for children ($n_{i,f}$=36) Child Ratio F:M (n) (4:32) *Time*: Day before surgery	Standard preoperative care ($n_{i,f}$=37) Child Ratio F:M (n) (4:33)	Not assessed	Not assessed	Not assessed	Reduced preoperative anxiety in the experimental group, with significant difference between groups. EG M=48.08; SD=9.52 vs. CG: M=53.59; SD=3.94, p=0.01. Reduced postoperative anxiety, with significant difference between groups. EG M=38.27; SD=8.93 vs. CG: M=53.81; SD=6.92, p=0.001. (STAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Fincher et al., 2012[68] Australia Hospital	RCT	Children 3-12Y (6Y) Parents	Preoperative **preparation program**, which included a photo file with the sequence of events that occur when a child is going to theatre, demonstration of equipment using peer modelling approach, and tour of preoperative bay and PACU. This program was tailored according to the child's age. Older children received more specific explanations. (n_i=37; n_f=35) Child Ratio F:M (n) (16:19) *Time*: 1 or 2 days before surgery for children 3-5^Y and 5 to 10 days for children aged six years and older.	Standard preoperative care (n_i=36; n_f=32) Child Ratio F:M (n) (18:14)	*PACU, arrival at Ward from PACU, 24h postop, 2 weeks postop (time for the results not detailed)* The pain score in the treatment group was significantly lower than in the control group EG Mdn=2.00[IQR 5.00] vs CG Mdn=4.00 [IQR 4.00], p=0.001). (FLACC if children aged <5Y; Faces Pain Scale Revised if ≥5Y), observed	*Baseline, admission to ward, Holding area, anaesthetic room, induction, PACU, arrival at Ward from PACU, 24h postop, 2 weeks postop.* No significant difference between groups in preoperative anxiety (-0.59; 95% CI [-1.23 to 0.06], p=0.07). Decreasing anxiety postoperatively regardless of group allocation. (m-YPAS, observed)	*2 weeks postoperatively* Majority of children (47.9%) experienced negative behavioural changes two weeks post-surgery with a total score > 81. No significant difference in post-hospital behaviour between groups EG M=83.66; SD=5.41 vs. CG M=83.40; SD=11.86; p>0.05). (Post-Hospital Behaviour Questionnaire, assessed by the parents)	*Baseline, admission to Ward, Holding area* Significant difference ↓ anxiety between groups (-2.32 CI [-4.06 to -0.56], p=0.01). (STAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Liguori et al., 2016[69] Italy Hospital	RCT	Children 6-11Y (8-9Y) Parents/ Guardian	6-minute **video**, in which two clown physicians take a tour of one of the operating theatres ('Clickamico' or 'Buddyclick'). Video integrated into an app for mobile devices. ($n_{i,f}$=20) Child Ratio F:M (n) (11:9) *Time*: Afternoon before the surgical procedure	Standard preoperative care ($n_{i,f}$=20) Child Ratio F:M (n) (9:11)	Not assessed	Significant difference ↓ preoperative anxiety between groups (EG M=33.00; SD=18.40 vs. CG M=48.60; SD=15.90; p=0.01. (m-YPAS, observed)	Not assessed	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Lin et al., 2019[70] Taiwan Hospital	RCT	Children 3-12Y (6Y) Parents/ Caregivers	Multi-component family-centred preoperative **preparation program**, which included a **tour** of the preoperative area and recovery room, 4-min cartoon **video** 'I am not Afraid of Surgery' and familiarisation with medical equipment. (n_i=35; n_f=32) Child Ratio F:M (n) (9:23) *Time*: Days before surgery (*not specified*)	Standard preoperative care (n_i=35; n_f=34) Child Ratio F:M (n) (7:27)	Not assessed	Not assessed	Preoperative scores in the experimental group were 3.4 points lower than those in the control group at T3 vs. T1 (estimated effect =-3.42, SE=1.23, p=0.01) and T2 vs. T1 (estimate=-2.37, SE=1.25, p=0.06) (Linear Mixed-Effects Model). Behaviour score of the control group increased over time T1-T3 (7.87↑12.23). (The Children's Emotional Manifestation Scale – CEMS, observed) None of the children in the experimental group had scores of 4 or 5 upon arrival in the RR, but two children in the control group had scores of 4. Children's postoperative behaviour did not significantly differ between the two groups upon arrival or at 15min (p=0.59, p=0.80, p=0.30, p=0.48, respectively; Fisher's exact test). Postop (Scoring system for emergence delirium, by Cole et al., 2002), observed. Two weeks after surgery, 1 child from the experimental group experienced negative behaviours (waking up crying) whereas none of the children in control group exhibited negative behaviours. (Telephone follow-up, reported by parents).	*T1 – baseline;* *T2 – holding area;* *T3 – induction of anaesthesia;* *T4 – recovery room.* The anxiety of the caregiver decreased over time, but there were no differences between groups and no interactions with time (T1-T3 EG 24.39↓21.48 vs. CG 24.98↓22.13). (APAIS, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Zhu et al., 2018[40] Singapore Hospital	RCT	Children 6-14Y (9Y) Parents	Postoperative pain management educational intervention **program** for parents, that included a booklet, a video and one-hour face-to-face teaching session on pain management. (n_i=54; n_f=49) Child Ratio F:M (n) (14:35) Parent Ratio F:M (n) (42:7) *Time*: 3 to 7 days before their children's operation	Standard preoperative care. (n_i=54; n_f=51) Child Ratio F:M (n) (21:30) Parent Ratio F:M (n) (44:7)	No statistically significant differences in the highest pain scores at 24h after the surgery (EG M=6.62; SD=2.65 vs. CG M=5.75; SD=2.73; F=1.22, p=0.30, Partial η^2=0.02) and between 24h and 2 weeks after surgery among the three groups (EG M=4.67; SD=3.30 vs. CG M=4.60; SD=3.27; F=0.06, p=0.95, Partial η^2=0.001). (Child's Pain Diary Form for parents with Numeric Rating Scale), parental report after being discharged.	Not assessed	Not assessed	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Li et al., 2007[71] Hong Kong Hospital	RCT	Children 7-12Y (9Y) Parents	**Therapeutic play** intervention for five children (and one of their parents) per group. (n_i=126; n_f=97) Child Ratio F:M (n) (30:67) *Time*: 1 week before surgery	Standard preoperative care. (n_i=122; n_f=106) Child Ratio F:M (n) (33:73)	No significant difference in mean postoperative pain scores for children in experimental and control groups (EG M=4.19; SD=1.18 vs. CG M=4.47; SD=1.24; t [201] =−1.68, p=0.09). (VAS, self-reported)	*Assessed in three different moments: pre-intervention, post-intervention and post-surgery.* Statistically significant main effect, suggesting that children in the experimental group experienced lower anxiety scores than children in the control group (F (1,201) =5.36, p<0.02, Partial η^2=0.04). Children in the experimental group reported lower anxiety scores than children in control group in both post-intervention and post operation periods (post-intervention scores EG M=34.36; SD=8.09 vs. CG M=38.60; SD=8.53; postoperative scores: EG M=33.58; SD=5.90 vs. CG M=36.16; SD=5.60). (Chinese version of the State Anxiety Scale for Children CSAS-C, observed)	Statistically significant difference in mean CEMS for children in experimental and control groups (EG M=10.46; SD=3.79 vs. CG M=13.63; SD=4.49; t [201] =−5.40, p<0.001), with children receiving the intervention exhibiting fewer emotions at induction of anaesthesia. (The Children's Emotional Manifestation Scale, observed)	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Kassai et al., 2016[72] France Hospital	RCT	Children 6-17Y (12Y) Parents	Comic information **leaflet**, with information regarding the surgical process and illustration in addition to the verbal information. (n_i=57; n_f=54) Child Ratio F:M (n) (29:25) *Time*: few days before hospitalization	Standard preoperative care (verbal information) (n_i=58; n_f=57) Child Ratio F:M (n) (30:27)	Not assessed	Anxiety scores lower in the experimental group than in the control group (EG 32.09 (baseline) to 30.07 (pre-op); CG 30.40 (baseline) to 31.30 (pre-op); estimate=-2.90, SE=0.90, t=-3.21, p=0.002) (STAIC-S, self-reported)	Not assessed	No significant differences between groups preoperatively (estimate=-0.03, SE=0.06, t=−0.48, p=0.63). (STAI, self-reported)
Aydin & Uyar, 2021[61] Turkey Hospital	RCT	Children 6-8Y (6Y) Mothers	Informative story **book** 'Elif is being operated' which gives details about the preoperative preparation, such as admission to the hospital, fasting before surgery, putting on surgical suits before surgery and going to the operating theatre. Books were either read by literate children or the mother of illiterate children. (n_i=60; n_f=51) Child Ratio F:M (n) (25:26) *Time*: Read at least once before the surgery (*not specified when it was given*).	Standard preoperative care and a non-medical colourful story book appropriate for their age. (n_i=60; n_f=51) Child Ratio F:M (n) (24:27)	Not assessed	*T0 - holding area; T1 - while entering the operating room.* Anxiety scores lower in the experimental group than in the control group at T0 and T1 (T0 - EG M=36.14; SD=11.7 vs. CG M=40.38; SD=11.2; p=0.03 and T1 EG M=27.16; SD=5.5 vs. CG M=29.67; SD=5.8; p=0.022, respectively). Also, those who read the intervention book more than three times, had lower anxiety scores than those who read two times or less (p<0.001). (m-YPAS, observed)	Not assessed	No significant differences between groups in terms of mothers' anxiety on the surgery's day (EG M=41.06; SD=8.1 vs. CG: M=38.41; SD=9.3; p=0.11). (STAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Matthyssens et al., 2020[73] Belgium Hospital	RCT	Children 5-11Y (7Y) Parents	CliniPup® (**game** that addresses pain management, what happens throughout the surgical process) and link to the e-learning module for parents and a link to digital scoring tools. (n_i=43; n_f=25) Child Ratio F:M (n) (8:17) *Time*: 7 days before surgery	Standard preoperative care. (n_i=29; n_f=25) Child Ratio F:M (n) (9:16)	Pain score in experimental group was significantly lower when compared with control group at T1 (b=−1.12, 95% CI from −2.10 to −0.14; p=0.03). No statistically significant difference between groups at T3 and T4 (*p values not detailed*). (VASp) (self-reported + assessed by parents)	*T0 - 1 week preoperatively;* *T1 - baseline, at home, after playing CliniPup®/empty game;* *T2 - at hospital admission;* *T3 - hospital, postoperatively, before discharge;* *T4 - at home, one week postoperatively;* *T5 - 1 month postoperatively.* Anxiety levels at T1 significantly lower in EG when compared to CG (EG M=1.90 vs. CG M=4.50, p=0.003). Anxiety Levels at T2 with no significant differences between groups: EG M=2.40 CG: M=4.10, p=0.14. Anxiety and pain were significantly correlated in this study at T1, T2 and T4 (rs^{T1}=0.26, p=0.04; rs^{T2}=0.34, p=0.04; rs^{T4}=0.51, p=0.00, respectively). (VASa) (0-4) (self-reported + assessed by parents)	*Measured at T5.* No significant differences between groups (p=0.78), after one month after surgery. (PHBQ-AS, reported by parents)	*Measured at T2.* No significant differences between groups preoperatively (p=0.45, n=34). (STAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Tabrizi et al., 2015[66] Iran Hospital	RCT	Children 8-10Y (9-10Y) Parents	**Preoperative visits** to children and parents were performed with a **booklet** and explanation provided by the anaesthesiologist. ($n_{i,f}$=18) Child Ratio F:M (n) (8:10) *Time*: Day before surgery	Standard preoperative care ($n_{i,f}$=15) Child Ratio F:M (n) (9:6)	Not assessed	Children who received training by the anaesthesiology residents (EG) had less anxiety than the ones in the control group (EG M=30.8; SD=6.0 vs. CG M=34.1; SD=6.7) on the surgery's morning. However, it was not statistically significant between two groups (p=0.1). (STAIC, self-reported)	Not assessed	Anxiety has been reduced after reading the book. EG before reading the book M=41; SD=12.7 vs. after reading the book M=35.6; SD=9.5; p=0.04. There was no significant difference between groups on the mothers' anxiety levels just before the operation (EG M=35.6; SD=9.5 vs. CG M=42.8; SD=14; p=0.1). (STAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Batuman et al., 2015[62] Turkey Hospital	RCT	Children 5-12Y (7-8Y) Parents	Information **video** regarding the perioperative period (fasting requirement, anaesthetic techniques and equipment used). Two scenes were created with a child, nurses, doctors and parents. ($n_{i,f}$=21) *Time*: On the day of surgery.	Standard preoperative care (verbal information) ($n_{i,f}$=21)	Not assessed	Operating room at induction of anaesthesia: Anxiety scores ↓ in the experimental group than in the control group (EG M=27.8; SD=7.8 vs. CG M=78.9; SD=12.9; p=0.001). (m-YPAS, observed)	1 week postoperatively Difficulty getting to sleep (EG n=0 vs. CG n=11); Nocturnal enuresis (EG n=0 vs. CG n=5); Fear of dark (EG n=0 vs. CG n=4); To object to go to bed at night (EG n=0 vs. CG = 10); Decreased appetite (EG n=0 vs. CG n=12), p<0.05. Children with high anxiety levels at induction had higher ratios of difficulty getting to sleep, object to go to bed at night, crying or being upset when left alone for a few minutes, temper tantrum, fear of dark, decreased appetite, refusal to comply with parents (r=0.65 p=0.001; r=0.56, p=0.001; r=0.37, p=0.02; p=0.02, r=0.35; p=0.04, r=0.31; p=0.001, r=0.52; p=0.03, r=0.34; respectively). (Post-Hospitalization Behavioural Questionnaire – PHBQ, reported by parents)	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Fernandes et al., 2014[74] Portugal Hospital	RCT	Children 8-12Y (10Y) Parents	Children received educational materials on the format of a board **game**, **video or** a **booklet** with information about surgery or hospitalization (healthcare professionals, medical instruments, clinical procedures and induction of anaesthesia, changing of clothes, parental separation for surgery). ($n_{i,f}$=45) Child Ratio F:M (n) (12:33) Parent Ratio F:M (n) (40:5) *Time*: Surgery's Day	No material received, but the same information was given. ($n_{i,f}$=35) Child Ratio F:M (n) (6:29) Parent Ratio F:M (n) (30:5)	Not assessed	Not assessed	Not assessed	No statistically significant differences for preoperative parental anxiety when comparing the experimental and the control group (p=0.78, d=0.06). (STAI-Form Y, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Ryu et al., 2017[55] Korea Hospital	RCT	Children 4-10Y (6Y) Parents	4-minute virtual reality **video** showing the operating theatre and explaining the perioperative process. (n_i=35; n_f=34) Child Ratio[i] F:M (n) (17:17) *Time*: One hour before surgery.	Standard preoperative care. ($n_{i,f}$=35) Child Ratio[i] F:M (n) (11:24)	Not assessed	Anxiety scores ↓ in the experimental group than in the control group in the preoperative holding area before entering the theatre (EG Mdn=31.70[23.30-37.90] vs. CG Mdn=51.70 [28.30-63.30], p<0.001). (m-YPAS, observed)	Significant differences in compliance and distress between experimental and control groups. More children in the EG showed perfect compliance (ICC score 0) (EG 28 of 34 vs. CG 12 of 35, p<0.001). (ICC, observed) The score PBRS was significantly lower in the experimental group than in the control group (EG Mdn=0.00[0.00-1.00] vs. CG Mdn=1.00[0.00-4.00], p=0.01) (PBRS – Procedural Behavioural Rating Scale), observed	Not assessed

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Wakimizu et al., 2009[76] Japan Hospital	RCT	Children 3-6Y (4-5Y) Parents/ Caregivers N_i=158 N_f=150 $N_{1month\ after\ surgery}$ = 144	Visualisation of the educational **video** 'Shujutsu ni ikou', that introduces the experience of a 5-year-old boy who is hospitalized for inguinal hernia. The participants in this group could watch the video as many times they wished during the week before surgery. Auxiliary booklet for the video was given to caregivers. (n_i=77; n_f=74) Child Ratio[i] F:M (n) (28:49) Parent Ratio[i] F:M (n) (74:3) *Time*: The week before surgery.	Visualisation of the educational video 'Shujutsu ni ikou' once, one week before surgery. Auxiliary booklet for the video was given to caregivers. (n_i=81; n_f=76) Child Ratio[i] F:M (n) (31:50) Parent Ratio[i] F:M (n) (75:6)	Not assessed	Significant group differences and group-by-time interaction in the anxiety levels (F=3.78, p<0.05; F=2.81, p=0.04, respectively) (Wong-Baker FACES Rating Scale), self-reported	Not assessed	Significant between-group difference over the study period (F=5.49, p=0.02). (STAI-S Japanese version), self-reported

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Sabaq & El-Awady, 2012[77] Egypt Hospital	Quasi-experi-mental	Children 9-12Y (10Y) Mothers	Preoperative program that included a **preoperative tour visit**, therapeutic play - a manikin demonstration and a return demonstration by the children on preoperative procedures. ($n_{i,f}$=60) Child Ratio F:M (n) (34:26) *Time*: Day before surgery	Standard preoperative care ($n_{i,f}$=60) Child Ratio F:M (n) (35:25)	Not assessed	Lower anxiety scores post-intervention in the experimental group than in the control group STAI Mean scores EG M=36.63, SD=2.18; CG M=44.80, SD=3.18, p<0.001) Low anxiety levels (≤37): EG n=45 of 60 vs. CG n=35 of 60 Moderate (38-44): EG n=8 of 60 vs. CG n=15 of 60 High anxiety (≥37): EG n=7 of 60 vs. CG n=10 of 60. (STAIC, self-reported)	Compliance during induction of anaesthesia higher in the experimental group than in the control group (Compliance EG n=39 of 60 vs. CG n=20 of 60, p=0.001; non-compliance EG n=21 of 60 vs. CG n=40 of 60, p=0.001). (ICC, observed) Children in the experimental group improved eating behaviour compared with children in the control group (POD2 50.00% vs. 33.30%; POD3 66.70% vs. 41.70%; POD7 83.30% vs. 66.70%, p≤0.05). Children in the control group had more problems falling asleep, staying asleep and waking up crying as compared with children in the experimental group (POD1 51.30% vs. 44.60%, p=0.05; POD2: 40.70% vs. 33.20%). (Post-Hospitalization Behavioural Questionnaire - PHBQ), completed by mothers	↓ Anxiety scores when comparing mothers in the experimental group to the control group preoperatively STAI Mean scores EG M=36.80, SD 2.19 vs. CG M=43.80, SD 3.17, p≤0.01). (STAI, self-reported)

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Vaezzadeh et al., 2011[67] Iran Hospital	RCT	Children 7-12Y (9Y) Mothers	Therapeutic play that included a group of structured activities, such as a **preoperative tour visit**, a manikin demonstration and a return demonstration by the children on preoperative procedures. ($n_{i,f}$=61) Child Ratio F:M (n) (19:42) *Time*: Day before surgery	Standard preoperative care ($n_{i,f}$=61) Child Ratio F:M (n) (18:43)	Not assessed	Children in experimental group reported significantly lower-level anxiety score in preoperative period (EG M=31.44, SD=5.87 vs. CG M=38.31, SD=7.44 post-intervention, respectively) (p=0.001) (Spielberger State Anxiety Scale for Children – SSAS-c), self-reported	Not assessed	Not assessed
Cumino et al., 2013[78] Brasil Hospital	RCT	Children 4-8Y (5-6Y) Parents	**Leaflet** for parents containing information about the anaesthetic procedure ($n_{i,f}$=36) Child Ratio F:M (n) (17:19) *Time*: after pre-anaesthetic assessment	Standard preoperative care (verbal information) ($n_{i,f}$=36) Child Ratio F:M (n) (10:26)	Not assessed	No significant difference between groups at the surgical centre waiting room (WR) and operating room (OR) times before induction of anaesthesia (WR: CG Mdn=26.70 [24.30-38.40] vs. EG Mdn=25.00[23.40-30.00], p=0.45; OR: CG Mdn=44.2[25.9-56.7] vs. EG Mdn=40.80[33.40-57.60], p=0.68). (m-YPAS), observed	Not assessed	No significant difference between groups preoperatively (EG Mdn=9.00 [3.25-17.50] vs. CG Mdn=8.00 [5.25-16.00], p=0.84). (HAM-A), self-reported

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Kumar et al., 2019[64] India Hospital	RCT	Children 5-15Y (8-9Y) Parents	**Preparation program**, in which children and parents were shown **images** of the operating room, ICU and postoperative ward. A **pamphlet** was also given. Children were also allowed to play games and videos during their stay in the preoperative ward. (n_i=30; n_f=28) Child Ratio F:M (n) (7:21) *Time*: Day before surgery.	Standard preoperative care (n_i=30; n_f=27) Child Ratio F:M (n) (15:12)	Postoperative pain score significantly low (p<0.001) in the experimental group (2.00[1.00-5.00]), compared to the control group (4.00[2.00-7.00]). (The Wong-Baker scale), self-reported	No significant differences between groups. State Preoperative scores: EG M=45.70; SD=5.10 vs. CG M=44.20; SD=5.30; p=0.29. Anxiety scores postoperatively significantly lower in the experimental group when compared to the control group (State Postoperative EG M=27.40; SD=2.90 vs. CG M=39.70; SD=4.30; p<0.001). (STAI-C), self-reported	Not assessed	Preoperative State anxiety (EG M=63.00; SD=11.70 vs. CG M=64.10; SD=7.50; p=0.69) and Trait anxiety (EG M=53.50; SD=14.90 vs. CG M=51.60; SD=9.20; p=0.58) were not significantly different between groups. Postoperative State anxiety were significantly higher in group control when compared with the experimental group (CG M=54.50; SD=7.80 vs. EG M=42.00; SD=4.40, p<0.001). There was no difference in postoperative Trait anxiety between groups. (STAI), self-reported

Author, year Location **Setting**	**Study design**	**Participants, age range (Mean)**	**Intervention** **Sample size (n)** ***Time of intervention***	**Comparator/ Control** **Sample size (n)**	**Summary of intervention effect based on authors' results (measure used)**			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Cumino et al., 2017[79] Brasil Hospital	RCT	Children 4-8Y (5-6Y) Parents	Informed group that received a **leaflet** containing information about the anaesthetic procedure. ($n_{i,f}$=21) Child Ratio F:M (n) (7:14) Parent Ratio F:M (n) (20:1) *Time*: Day before surgery.	Standard preoperative care (only information). ($n_{i,f}$=21) Child Ratio F:M (n) (7:14) Parent Ratio F:M (n) (20:1)	Not assessed	No statistically differences between the EG when compared to the control group at the holding area (EG Mdn=23.40 [23.40-25.00], vs. CG Mdn=23.40 [23.40-41.70], p=0.19). Statistic differences between the EG and the CG at the induction of anaesthesia (EG Mdn=28.40[23.40-45.00], vs. CG Mdn=55.00 [30.00-68.40], p=0.02). (m-YPAS), observed	Not assessed	Not assessed
Fernandes et al., 2015[75] Portugal Hospital	RCT	Children 8-12Y (9Y) Parents Child Ratio F:M (n) (21:69) Parent Ratio F:M (n) (78:12)	Multimedia **application/ game** 'An Adventure at the Hospital' divided into different levels to illustrate hospital procedures and perioperative stages (from admission to aftercare). ($n_{i,f}$=30) *Time*: Surgery's Day	Standard preoperative care/ no intervention ($n_{i,f}$=30)	Not assessed	Not assessed	Not assessed	Preoperative parental anxiety was lower in the educational multimedia group (EG M=1.89; SD=0.54), when compared to the control group (CG M=2.19; SD=0.60; p=0.033). (STAI – Form Y) (0-4), self-reported

Author, year Location Setting	Study design	Participants, age range (Mean)	Intervention Sample size (n) *Time of intervention*	Comparator/ Control Sample size (n)	Summary of intervention effect based on authors' results (measure used)			
					Child/Adolescent's outcomes			Parents' outcomes
					Pain	Anxiety	Behaviours	Anxiety
Eijlers et al., 2019[80] Netherlands Hospital	RCT	Children 4-12Y (9Y) Parents	**Virtual reality video** environment modelled according to the real operating theatre and medical staff (two versions, one for children aged 4-7^{Y} and 8-12^{Y}). (ni=100; n_f=94) Child Ratio F:M (n) (49:45) *Time*: Surgery's Day	Standard preoperative care (n_i=100; n_f=97) Child Ratio F:M (n) (41:56)	No differences in pain levels were found between the experimental group and the control group, neither when self-reported with FPS-r at T4 (EG 2.00 [0.00-4.00] vs. CG 2.00 [0.00-2.50], p=0.70), nurse-observed with FLACC at T4 (EG 0.00 vs. CG 0.00, p=0.70) nor parent-observed with PPPM at T5 (EG 3.00 [0.00-5.00] vs. CG 3.00 [1.00-8.00], p=0.41). (FPS-r self-reported) (FLACC observed) (PPPM – parent report)	*T1 hospital admission* *T2 holding area* *T3 induction of anaesthesia* *T4 recovery room* *T5 at home* No differences in anxiety levels were found between groups at different time points. **mYPAS**: T2 EG Mdn=28.30 [23.30-36.70] vs. CG Mdn=28.30 [23.30-41.70], p=0.77; T3 EG Mdn=40.00 [28.30-58.30] vs. CG Mdn=38.30 [28.30-53.30], p=0.86. **VAS**: T2 EG Mdn=3.00 [0.10-5.50] vs. CG Mdn=3.50[0.00-6.00], p=0.75. (m-YPAS - observed) (VAS - self-reported)	No differences were found in emergence delirium symptoms between groups at T4 (EG Mdn=7.00[5.00-8.00] vs. CG Mdn=6.00[5.00-9.00], p=0.266). (Paediatric Anaesthesia Emergence Delirium – PAED observed)	No differences in parental anxiety were found between groups, either when self-reported at the induction of anaesthesia (STAI-state) (EG Mdn=41.00 [34.50-48.50] vs. CG Mdn=40.5 [33.00-50.00], p=0.75), or when observed (VAS) (EG Mdn=3.00 [2.00-5.00] vs. CG Mdn=3.50 [2.00-5.00], p=0.42). (STAI self-reported) (VAS observed)

Abbreviations: CG: control group; EG: experimental group; n_i: Initial participants' number; n_f: Final/analysed participants' number; Child Ratio F:M: Children's gender proportion (female: male); Parent Ratio F:M: Parental gender proportion (female: male); M: mean; MD: mean difference; Mdn: median; SD: standard deviation; STAI: State-Trait Anxiety Inventory; BAI: The Beck Anxiety Inventory; CEMS: The Children's Emotional Manifestation Scale; CSAS-C: Chinese version of the State Anxiety Scale for Children; EDCEO: *Échelle descriptive du comportement de l'enfant opéré;* FLACC scale: Face, Legs, Activity, Cry, Consolability; FPS-r: Faces Pain Scale revised; m-YPAS: The modified Yale Preoperative Anxiety Scale; mCHEOPS: Modified Children's Hospital of Eastern Ontario Pain Score; PHBQ: Post-Hospitalization Behavioural Questionnaire; PPPM: Parents' Postoperative Pain Measure; VAS: Visual Analogue Scale; POD: Postoperative day; VR – Virtual reality.

Supplement I: Search strategy

MEDLINE (via PubMed). Search conducted on **April 13th, 2021**

Search	Query	Records retrieved
#1	adolescen*[Title/Abstract] OR teen*[Title/Abstract] OR youth[Title/Abstract] OR child*[Title/Abstract] OR paediatric*[Title/Abstract] OR pediatric*[Title/Abstract] OR parent*[Title/Abstract] OR mother*[Title/Abstract] OR father*[Title/Abstract] OR "early adulthood"[Title/Abstract] OR "young adulthood"[Title/Abstract] OR Family[Title/Abstract] OR Caregiver*[Title/Abstract] OR Care-giver[Title/Abstract] OR Carer*[Title/Abstract]	2,942,362
#2	Surg*[Title/Abstract] OR "pre-operative"[Title/Abstract] OR Preoperative[Title/Abstract] OR Perioperative[Title/Abstract] OR postoperative[Title/Abstract]	2,358,782
#3	"audiovisual aids"[Title/Abstract] OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session"[Title/Abstract] OR DVD OR "digital versatile disc"[Title/Abstract] OR video* OR leaflet* OR "non-pharmacological intervention"[Title/Abstract] OR "nonpharmacological intervention"[Title/Abstract] OR "Complementary Therapy"[Title/Abstract] OR "family centered care"[Title/Abstract] OR "family centred care"[Title/Abstract]	2,095,378
#4	pain*[Title/Abstract] OR anxiety[Title/Abstract] OR behaviour[Title/Abstract] OR behavior[Title/Abstract] OR STAI[Title/Abstract] OR "FLACC"[Title/Abstract] OR "visual analog scale"[Title/Abstract]	1,784,997
#5	"Adolescent"[Mesh] OR "Minors"[Mesh] OR "Child"[Mesh:NoExp] OR "Child, Preschool"[Mesh] OR "Family"[Mesh:NoExp] OR "Parents"[Mesh] OR "Mothers"[Mesh] OR "Fathers"[Mesh] OR "Caregivers"[Mesh:NoExp]	3,209,023
#6	"Elective Surgical Procedures"[Mesh] OR "Surgical Procedures, Operative"[Mesh:NoExp] OR "preoperative care"[Mesh] OR "perioperative care"[Mesh] OR "postoperative care"[Mesh]	217,009
#7	"Hypermedia"[Mesh] OR "Education"[Mesh:NoExp] OR "Teaching"[Mesh:NoExp] OR "Teaching Materials"[Mesh:NoExp] OR "Audiovisual Aids"[Mesh:NoExp] OR "Multimedia"[Mesh] OR "Videotape Recording"[Mesh] OR "Books"[Mesh:NoExp] OR "Pamphlets"[Mesh:NoExp] OR "Complementary Therapies"[Mesh:NoExp]	117,172
#8	"Pain"[Mesh:NoExp] OR "Pain, Postoperative"[Mesh:NoExp] OR "Anxiety"[Mesh:NoExp] OR "Acute Pain"[Mesh] OR "Behavior"[Mesh:NoExp]	288,558
#9	#1 OR #5	4,711,539
#10	#2 OR #6	2,414,594
#11	#3 OR #7	2,110,674
#12	#4 OR #8	1,855,885
#13	#9 AND #10 AND #11 AND #12	4,751
#14	Filters: Limited to from 2007/01/01	3,219
#15	Languages: English, Spanish and Portuguese	3,103

CINHAL (via EBSCOhost). Search conducted on **April 13th, 2021**

Search	Query	Records retrieved
#1	TI (adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR "early adulthood" OR "young adulthood" OR Family OR Caregiver* OR Care-giver OR Carer*) OR AB (adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR "early adulthood" OR "young adulthood" OR Family OR Caregiver* OR Care-giver OR Carer*)	227,285
#2	TI (Surg* OR "pre-operative" OR Preoperative OR Perioperative OR postoperative) OR AB (Surg* OR "pre-operative" OR Preoperative OR Perioperative OR postoperative)	255,490
#3	TI ("audiovisual aids" OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session" OR DVD OR "digital versatile disc" OR video* OR leaflet* OR "non-pharmacological intervention" OR "nonpharmacological intervention" OR "Complementary Therapy" OR "family centered care" OR "family centred care") OR AB ("audiovisual aids" OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session" OR DVD OR "digital versatile disc" OR video* OR leaflet* OR "non-pharmacological intervention" OR "nonpharmacological intervention" OR "Complementary Therapy" OR "family centered care" OR "family centred care")	78,290
#4	TI (pain* OR anxiety OR behaviour OR behavior OR STAI OR "FLACC" OR "visual analog scale") OR AB (pain* OR anxiety OR behaviour OR behavior OR STAI OR "FLACC" OR "visual analog scale")	274,223
#5	MM "Adolescence" OR MM "Child" OR MM "Child, Preschool" OR MM "Minors (Legal)" OR MM "Family" OR MM "Parents" OR MM "Mothers" OR MM "Fathers" OR MM "Caregivers"	86,873
#6	MM "Preoperative care" OR MM "Surgery, Elective" OR MM "Postoperative care" OR MM "Perioperative care" OR MM "Ambulatory Surgery"	28,793
#7	MM "hypermedia" OR MM "multimedia" OR MM "education" OR MM "teaching" OR MM "teaching materials" OR MM "preoperative education" OR MM "Teaching: Preoperative (Iowa NIC)" OR MM "Teaching materials, clinical" OR MM "books" OR MM "electronic books" OR MM "print materials" OR MM "pamphlets" OR MM "Alternative Therapies"	37,141
#8	MM "Postoperative pain" OR MM "Pain" OR MM "Anxiety" OR MM "Behavior"	88,948
#9	#1 OR #5	973,825
#10	#2 OR #6	487,506
#11	#3 OR #7	426,076
#12	#4 OR #8	577,904
#13	#9 AND #10 AND #11 AND #12	754
#14	Filters: Limited to from 2007/01/01	564
#15	Languages: English, Spanish and Portuguese	525

Cochrane Central Register of Controlled Trials (via EBSCOhost). Search conducted on **April 13th, 2021**

Search	Query	Records retrieved
#1	TI (adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR "early adulthood" OR "young adulthood" OR Family OR Caregiver* OR Care-giver OR Carer*) OR AB (adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR "early adulthood" OR "young adulthood" OR Family OR Caregiver* OR Care-giver OR Carer*)	227,285
#2	TI (Surg* OR "pre-operative" OR Preoperative OR Perioperative OR postoperative) OR AB (Surg* OR "pre-operative" OR Preoperative OR Perioperative OR postoperative)	255,490
#3	TI ("audiovisual aids" OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session" OR DVD OR "digital versatile disc" OR video* OR leaflet* OR "non-pharmacological intervention" OR "nonpharmacological intervention" OR "Complementary Therapy" OR "family centered care" OR "family centred care") OR AB ("audiovisual aids" OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session" OR DVD OR "digital versatile disc" OR video* OR leaflet* OR "non-pharmacological intervention" OR "nonpharmacological intervention" OR "Complementary Therapy" OR "family centered care" OR "family centred care")	78,290
#4	TI (pain* OR anxiety OR behaviour OR behavior OR STAI OR "FLACC" OR "visual analog scale") OR AB (pain* OR anxiety OR behaviour OR behavior OR STAI OR "FLACC" OR "visual analog scale")	274,223
#5	MH "Adolescent" OR "Minors" OR "Child" OR "Child, Preschool" OR "Family" OR "Parents" OR "Mothers" OR "Fathers" OR "Caregivers"	131,505
#6	MH "Elective Surgical Procedures" OR "Surgical Procedures, Operative" OR "preoperative care" OR "perioperative care" OR "postoperative care"	6,975
#7	MH "Hypermedia" OR "Education" OR "Teaching" OR "Teaching Materials" OR "Audiovisual Aids" OR "Multimedia" OR "Videotape Recording" OR "Books" OR "Pamphlets" OR "Complementary Therapies"	3,541
#8	MH "Pain" OR "Pain, Postoperative" OR "Anxiety" OR "Acute Pain" OR "Behavior"	5,416
#9	#1 OR #5	308,919
#10	#2 OR #6	256,539
#11	#3 OR #7	79,763
#12	#4 OR #8	275,234
#13	#9 AND #10 AND #11 AND #12	642
#14	Filters: Limited to from 2007/01/01	549
#15	Languages: English, Spanish and Portuguese	249

PsycINFO (via EBSCOhost). Search conducted on **April 13th, 2021**

Search	Query	Records retrieved
#1	TI (adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR "early adulthood" OR "young adulthood" OR Family OR Caregiver* OR Care-giver OR Carer*) OR AB (adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR "early adulthood" OR "young adulthood" OR Family OR Caregiver* OR Care-giver OR Carer*)	1,212,659
#2	TI (Surg* OR "pre-operative" OR Preoperative OR Perioperative OR postoperative) OR AB (Surg* OR "pre-operative" OR Preoperative OR Perioperative OR postoperative)	53,770
#3	TI ("audiovisual aids" OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session" OR DVD OR "digital versatile disc" OR video* OR leaflet* OR "non-pharmacological intervention" OR "nonpharmacological intervention" OR "Complementary Therapy" OR "family centered care" OR "family centred care") OR AB ("audiovisual aids" OR book* OR multimedia* OR hypermedia OR pamphlet* OR education OR "teaching session" OR DVD OR "digital versatile disc" OR video* OR leaflet* OR "non-pharmacological intervention" OR "nonpharmacological intervention" OR "Complementary Therapy" OR "family centered care" OR "family centred care")	612,500
#4	TI (pain* OR anxiety OR behaviour OR behavior OR STAI OR "FLACC" OR "visual analog scale") OR AB (pain* OR anxiety OR behaviour OR behavior OR STAI OR "FLACC" OR "visual analog scale")	1,002,197
#5	MA "Adolescent" OR "Minors" OR "Child" OR "Child, Preschool" OR "Family" OR "Parents" OR "Mothers" OR "Fathers" OR "Caregivers"	416,167
#6	MA "Elective Surgical Procedures" OR "Surgical Procedures, Operative" OR "preoperative care" OR "perioperative care" OR "postoperative care"	1,944
#7	MA "Hypermedia" OR "Education" OR "Teaching" OR "Teaching Materials" OR "Audiovisual Aids" OR "Multimedia" OR "Videotape Recording" OR "Books" OR "Pamphlets" OR "Complementary Therapies"	62,902
#8	MA "Pain" OR "Pain, Postoperative" OR "Anxiety" OR "Acute Pain" OR "Behavior"	309,216
#9	#1 OR #5	1,376,746
#10	#2 OR #6	54,103
#11	#3 OR #7	649,702
#12	#4 OR #8	1,137,403
#13	#9 AND #10 AND #11 AND #12	570
#14	Filters: Limited to from 2007/01/01	344
#15	Languages: English, Spanish and Portuguese	333

SciELO. Search conducted on **April 9th, 2021**

Search	Query	Records retrieved
#1	(ti:(adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR “early adulthood” OR “young adulthood”)) OR (ab:(adolescen* OR teen* OR youth OR child* OR paediatric* OR pediatric* OR parent* OR mother* OR father* OR “early adulthood” OR “young adulthood”))	1,307
#2	(ti:(Surgery OR "pre-operative preparation" OR "preoperative preparation" OR surgical)) OR (ab:(Surgery OR "pre-operative preparation" OR "preoperative preparation" OR surgical))	36,133
#3	(ti:(“audiovisual aids” OR book* OR multimedia* OR pamphlet* OR education OR “teaching session” OR DVD OR video* OR leaflet* OR “non-pharmacological intervention” OR “nonpharmacological intervention” OR "Complementary Therapy" OR "family centered care")) OR (ab:(“audiovisual aids” OR book* OR multimedia* OR pamphlet* OR education OR “teaching session” OR DVD OR video* OR leaflet* OR “non-pharmacological intervention” OR “nonpharmacological intervention” OR "Complementary Therapy" OR "family centered care"))	842
#4	(ti:(pain* OR anxiety OR behaviours OR behavior)) OR (ab:(pain* OR anxiety OR behaviours OR behavior))	54,029
#6	#1 AND #2 AND #3 AND #4	0
#7	Filters: Limited to from 2007/01/01 Languages: English, Spanish and Portuguese	0

* As no results were found for this search (at the time, the database was having problems), the authors tried a simpler search strategy.

SciELO. Search conducted on **April 15th, 2021**

Search	Query	Records retrieved
#1	(child* AND educat* AND anxiety)	117
#7	Filters: Limited to from 2007/01/01 Languages: English, Spanish and Portuguese	102

OpenGrey. Search conducted on **April 3rd, 2021**

Search	Query	Records retrieved
#1	Intervention child surgery	1
#2	Filters: Limited to from 2007/01/01 Languages: English, Spanish and Portuguese	1

Open Access Theses and Dissertations. Search conducted on **April 3rd, 2021**

Search	Query	Records retrieved
#1	intervention AND child AND surgery	58
#2	Filters: Limited to from 2007/01/01 Languages: English, Spanish and Portuguese	32

Repositório Científico de Acesso Aberto em Portugal (RCAAP). Search conducted on **April 9th, 2021**

Search	Query	Records retrieved
#1	Família AND criança AND ansiedade (field: discussion)	177
#2	Filters: Limited to from 2007/01/01 Languages: English, Spanish and Portuguese	155

Supplement II: Studies ineligible following full-text review

1. Adams HA. A Perioperative Education Program for Paediatric Patients and their Parents. AORN J. 2011;93(4):472-81.
   Reason for exclusion: Ineligible study design (literature review).
2. Akinci SB, Köse EA, Ocal T, Aypar U. The effects of maternal presence during anesthesia induction on the mother's anxiety and changes in children's behavior. Turk J Pediatr. 2008;50(6):566-71.
   Reason for exclusion: Ineligible intervention.
3. Álvarez García N, Gómez Palacio V, Siles Hinojosa A, Gracia Romero J. Psychoprophylaxis in elective paediatric general surgery: does audiovisual tools improve the perioperative anxiety in children and their families?. Cir Pediatr. 2017;30(4):216-20.
   Reason for exclusion: Ineligible study design, intervention and outcomes only for children.
4. Arnon Z, Hanan H, Mogilner J. The effect of a hypnotic-based animated video on stress and pain reduction in pediatric surgery. Int J Clin Exp Hypn. 2018;66(2):123-33.
   Reason for exclusion: Intervention and outcomes only for children.
5. Baghele A, Dave N, Dias R, Shah H. Effect of preoperative education on anxiety in children undergoing day-care surgery. Indian J Anaesth. 2019;63(7):565-70.
   Reason for exclusion: Intervention and outcomes only for children.
6. Bailey KM, Bird SJ, McGrath PJ, Chorney JE. Preparing Parents to Be Present for Their Child's Anesthesia Induction: A Randomized Controlled Trial. Anesth Analg. 2015;121(4):1001-10.
   Reason for exclusion: Ineligible intervention.
7. Berghmans J, Weber F, van Akoleyen C, Utens E, Adriaenssens P, Klein J, et al. Audiovisual aid viewing immediately before pediatric induction moderates the accompanying parents' anxiety. Paediatr Anaesth. 2012;22(4):386-92.
   Reason for exclusion: Ineligible population. Dr JB was contacted by email (31.7% of the study sample size was under 3 years old).
8. Book F, Goedeke J, Poplawski A, Muensterer OJ. Access to an online video enhances the consent process, increases knowledge, and decreases anxiety of caregivers with children scheduled for inguinal hernia repair: A randomized controlled study. J Pediatr Surg. 2020;55(1):18-28.
   Reason for exclusion: Ineligible intervention.

9. Chorney JM, Kain ZN. Behavioral analysis of children's response to induction of anesthesia. Anesth Analg. 2009;109(5):1434-40.
Reason for exclusion: Ineligible intervention, study design.

10. Chorney JM, Tan ET, Kain ZN. Adult-child interactions in the postanesthesia care unit: behavior matters. Anesthesiology. 2013;118(4):834-41.
Reason for exclusion: Ineligible intervention.

11. Crandall M, Lammers C, Senders C, Braun JV, Savedra M. Children's pre-operative tonsillectomy pain education: clinical outcomes. Int J Pediatr Otorhinolaryngol. 2008;72(10):1523-33.
Reason for exclusion: Intervention and outcomes only for children.

12. Dalley JS, McMurtry CM. Teddy and I Get a Check-Up: A Pilot Educational Intervention Teaching Children Coping Strategies for Managing Procedure-Related Pain and Fear. Pain Res Manag. 2016;2016(0):4383967.
Reason for exclusion: Intervention and outcomes only for children.

13. De Armendi A, Gillaspy S, Shukry M, Martinez M, Cure J. Spanish video in anesthesia as an uncertainty and anxiety reducer tool in Spanish speaking parents. Br J Anaesth. 2012;108(0):ii286-ii7.
Reason for exclusion: Abstract only.

14. Eijlers R, Legerstee JS, Dierckx B, Staals LM, Berghmans J, van der Schroeff MP, et al. Development of a Virtual Reality Exposure Tool as Psychological Preparation for Elective Pediatric Day Care Surgery: Methodological Approach for a Randomized Controlled Trial. JMIR Res Protoc. 2017;6(9):e174.
Reason for exclusion: Ineligible study design (protocol).

15. Festini F, Liguori S, Stacchini M, Ciofi D, Giusti F, Olivini N, et al. Effectiveness of a new method to reduce preoperative anxiety in children: randomised controlled trial. Arch Disease Child. 2014;99(0):A79.
Reason for exclusion: Abstract only.

16. Fincher W, Shaw J, Ramelet A-S. Pre-operative preparation can ease children's and parents' anxieties. Nurs Child Young People. 2012;24(4):11.
Reason for exclusion: Abstract only.

17. Fortier MA, Blount RL, Wang SM, Mayes LC, Kain ZN. Analysing a family-centred preoperative intervention programme: a dismantling approach. Br J Anaesth. 2011;106(5):713-8.
Reason for exclusion: Ineligible study design.

18. Fortier MA, Bunzli E, Walthall J, Olshansky E, Saadat H, Santistevan R, et al. Web-based tailored intervention for preparation of parents and children for outpatient surgery (WebTIPS): formative evaluation and randomized controlled trial. Anesth Analg. 2015;120(4):915-22.
Reason for exclusion: Ineligible population. Dr MF was contacted by email. Did not receive a response regarding the study sample size under 3 years old until the July 26th 2021, data in which the authors started the findings review.

19. Hamza Taha SM, Hassan El-Sayed RE. Effect of an Educational Comic Story about Preoperative Orientation on Information and Anxiety Level of Children Undergoing Surgery. Clin Nurs Res. 2021; 30(6):771-779.
Reason for exclusion: Intervention and outcomes only for children.

20. Hee H, Lim E, Tan Q, Bao Z, Loh K, Hee HI, et al. Effect of preoperative education on behaviour of children during induction of anaesthesia: a randomised clinical trial of efficacy. Anaesth Intensive Care. 2012;40(5):795-802.
Reason for exclusion: Intervention and outcomes only for children.

21. Helgadóttir HL, Wilson ME. A Randomized Controlled Trial of the Effectiveness of Educating Parents about Distraction to Decrease Postoperative Pain in Children at Home after Tonsillectomy. Pain Manag Nurs. 2014;15(3):632-40.
Reason for exclusion: Ineligible intervention.

22. Hilly J, Hörlin AL, Kinderf J, Ghez C, Menrath S, Delivet H, et al. Preoperative preparation workshop reduces postoperative maladaptive behavior in children. Paediatr Anaesth. 2015;25(10):990-8.
Reason for exclusion: Ineligible study design.

23. Jang O. Efficacy of two screen-based approaches to relieving preoperative anxiety in young children: preliminary data. Boston: Boston University; 2017.
Reason for exclusion: Ineligible intervention.

24. Jang O, Rodriguez S, Caruso T, Hernandez M, Simons L. A bed-mounted screen-based approach to managing preoperative anxiety in young children undergoing mask induction of anesthesia. J Pain. 2017;18(Suppl 1):S42-S.
Reason for exclusion: Abstract only.

25. Ji L, Zhang X, Fan H, Han M, Yang H, Tang L, et al. drawMD APP-aided preoperative anesthesia education reduce parents' anxiety and improve satisfaction. Patient Educ Couns. 2016;99(2):265-70.
Reason for exclusion: Methodology lacked rigour. Allocation to treatment groups unclear; treatment delivery blind to treatment assignment unclear; outcomes assessors were not blind to treatment allocation; unclear the appropriate statistical analysis used.

26. Jin Y, Jiang A, Jiang W, Wu W, Ye L, Kong X, et al. Self-produced audio-visual animation introduction alleviates preoperative anxiety in pediatric strabismus surgery: a randomized controlled study. BMC Ophthalmol. 2021;21(1):163.
Reason for exclusion: Ineligible intervention.

27. Kain ZN, Caldwell-Andrews A, Mayes L, Weinberg M, Wang S-M, MacLaren J, et al. Family-centered Preparation for Surgery Improves Perioperative Outcomes in Children. Anesthesiology. 2007;106(1):65-74.
Reason for exclusion: Ineligible population.

28. Kain ZN, Fortier MA, Chorney JM, Mayes L. Web-based tailored intervention for preparation of parents and children for outpatient surgery (WebTIPS): development. Anesth Analg. 2015;120(4):905-14.
Reason for exclusion: Ineligible study design.

29. Kerimoglu B, Neuman A, Paul J, Stefanov DG, Twersky R. Anesthesia induction using video glasses as a distraction tool for the management of preoperative anxiety in children. Anesth Analg. 2013;117(6):1373-9.
Reason for exclusion: Ineligible intervention.

30. Khan S, Tumin D, King A, Rice J, Jatana KR, Tobias JD, et al. Utilization of a postoperative adenotonsillectomy teaching video: a pilot study. Int J Pediatr Otorhinolaryngol. 2017;102:76-9.
Reason for exclusion: Intervention and outcomes only for parents.

31. Landier M, Villemagne T, Le Touze A, Braïk K, Meignan P, Cook AR, et al. The position of a written document in preoperative information for pediatric surgery: a randomized controlled trial on parental anxiety, knowledge, and satisfaction. J Pediatr Surg. 2018;53(3):375-80.
Reason for exclusion: Intervention and outcomes only for parents.

32. Lee J, Lee J, Lim H, Son JS, Lee JR, Kim DC, et al. Cartoon distraction alleviates anxiety in children during induction of anesthesia. Anesth Analg. 2012;115(5):1168-73.
Reason for exclusion: Ineligible intervention.

33. Lerwick J. The Impact of Child-Centered Play Therapy on Anxiety Levels in Pre-Neurosurgical Pediatric Patients. Oregon: Oregon State University; 2011.
Reason for exclusion: Ineligible intervention.

34. Li HC, Lopez V. Effectiveness and appropriateness of therapeutic play intervention in preparing children for surgery: a randomized controlled trial study. J Spec Pediatr Nurs. 2008;13(2):63-73.
Reason for exclusion: Duplicate study sample.

35. Li HC, Lopez V, Lee TL. Psychoeducational preparation of children for surgery: the importance of parental involvement. Patient Educ Couns. 2007;65(1):34-41.
Reason for exclusion: Duplicate study sample.

36. Li HCW. Evaluating the effectiveness of preoperative interventions: The appropriateness of using the Children's Emotional Manifestation Scale. J Clin Nurs. 2007;16(10):1919-26.
Reason for exclusion: Intervention and outcomes only for children.

37. Liu CY, Xu L, Zang YL. Effectiveness of audiovisual interventions on stress responses in adolescents with ENT surgery in hospital: randomized controlled trial protocol. J Adv Nurs. 2014;70(6):1414-24.
Reason for exclusion: Ineligible study design (protocol).

38. Macindo JR, Macabuag KR, Macadangdang CM, Macaranas MV, Macarilay MJ, Madriñan NN, et al. 3-D Storybook: Effects on Surgical Knowledge and Anxiety Among Four- to Six-Year-Old Surgical Patients. AORN J. 2015;102(1):62.e1-10.
Reason for exclusion: Intervention and outcomes only for children.

39. Martin SR, Chorney JM, Tan ET, Fortier MA, Blount RL, Wald SH, et al. Changing healthcare providers' behavior during pediatric inductions with an empirically based intervention. Anesthesiology. 2011;115(1):18-27.
Reason for exclusion: Ineligible intervention.

40. Nair T, Choo CSC, Abdullah NS, Lee S, Teo LLE, Chen Y, et al. Home-Initiated-Programme-to-Prepare-for-Operation: evaluating the effect of an animation video on perioperative anxiety in children: a randomised controlled trial. Eur J Anaesthesiol. 2021; 38(8):880-7.
Reason for exclusion: Intervention and outcomes only for children.

41. Nilsson E, Svensson G, Frisman GH. Picture book support for preparing children ahead of and during day surgery. Nurs Child Young People. 2016;28(8):30-5.
Reason for exclusion: Ineligible study design (descriptive intervention study).

42. Piper KN, Baxter KJ, Wetzel M, McCracken C, Travers C, Slater B, et al. Provider education decreases opioid prescribing after pediatric umbilical hernia repair. J Pediatr Surg. 2020;55(7):1319-23.
Reason for exclusion: Ineligible population.

43. Rehman J, Rempel G, Williams E, Meakins L, Bauman M, Massicotte P, et al. Development and Evaluation of a Preoperative Preparation Program for Parents of Children undergoing Fontan Surgery. Can J Cardiol. 2020;36(10):S26.
Reason for exclusion: Abstract only.

44. Sakizci Uyar B, Polat R, Bolat M, Donmez A. Which is good for pre-operative anxiety? Midazolam, video games or teaching with cartoons: a randomised trial. Eur J Anaesthesiol. 2021;38(7):744-50.
Reason for exclusion: Intervention and outcomes only for children.

45. Sekhavatpour Z, Khanjani N, Reyhani T, Ghaffari S, Dastoorpoor M. The effect of storytelling on anxiety and behavioral disorders in children undergoing surgery: a randomized controlled trial. Pediatric Health Med Ther. 2019;10:61-8.
Reason for exclusion: Intervention and outcomes only for children.

46. Seyedhejazi M, Sharabiani BA, Davari A, Taghizadieh N. A comparison of preoperative psychological preparation with midazolam premedication to reduce anxiety in children undergoing adenotonsillectomy. Afr J Paediatr Surg. 2020;17(1-2):10-4.
Reason for exclusion: Intervention and outcomes only for children.

47. Shaheen A, Nassar O, Khalaf I, Kridli SA, Jarrah S, Halasa S. The effectiveness of age-appropriate pre-operative information session on the anxiety level of school-age children undergoing elective surgery in Jordan. Int J Nurs Pract. 2018;24(3):e12634.
Reason for exclusion: Intervention and outcomes only for children.

48. Shoja M, Heshmati Nabavi F, Ramezani M, Saki A. Effect of a Preoperative Preparation Program on Anxiety in School-age Children Undergoing Surgery Using a Factorial Design. J Evid Based Healthc. 2018;7(4):30-7.
Reason for exclusion: Intervention and outcomes only for children.

49. Teixeira EMD, de Figueiredo MCB. The child's preoperative experience in a planned surgery. Revista de Enfermagem Referência. 2009(9):7-14.
Reason for exclusion: Ineligible study design (qualitative study).

50. Tomaszek L, Cepuch G, Fenikowski D. Influence of preoperative information support on anxiety, pain and satisfaction with postoperative analgesia in children and adolescents after thoracic surgery: A randomized double blind study. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2019;163(2):172-8.
Reason for exclusion: Ineligible intervention.

51. Tunney AM. A study to access the effectiveness of the provision of written material in the form of a storybook in lessening anxiety in children aged 5-11 years undergoing tonsillectomy and adenoidectomy. Ulster: University of Ulster; 2014.
Reason for exclusion: Intervention and outcomes only for children.

52. Tural Buyuk E, Bolişik B. An Analysis of the Anxiety Levels of Mothers Who Participate in Education and Therapeutic Games About Their Children's Surgeries. J Perianesth Nurs. 2018;33(3):290-5.
Reason for exclusion: Intervention and outcomes only for mothers.

53. Türk E, Güven A, Karaca F, Edirne Y, Karaca I. Using the parents' video camera for the follow-up of children who have undergone hypospadias surgery decreases hospital anxiety of children. J Pediatr Surg. 2013;48(11):2332-5.
Reason for exclusion: Ineligible intervention.

54. Verschueren S, van Aalst J, Bangels AM, Toelen J, Allegaert K, Buffel C, et al. Development of CliniPup, a Serious Game Aimed at Reducing Perioperative Anxiety and Pain in Children: Mixed Methods Study. JMIR Serious Games. 2019;7(2):e12429.
Reason for exclusion: Ineligible study design.

55. Volpato Broering C, Duarte de Souza C, Kaszubowski E, Aparecida Crepaldi M. Effects of pre-surgical psychological preparations on stress and anxiety in boys and girls. Acta Colom Psicol. 2018;21(1):228-38.
Reason for exclusion: Intervention and outcomes only for children.

56. West N, Christopher N, Stratton K, Görges M, Brown Z. Reducing preoperative anxiety with Child Life preparation prior to intravenous induction of anesthesia: A randomized controlled trial. Paediatr Anaesth. 2020;30(2):168-80.
Reason for exclusion: Intervention and outcomes only for children.

57. Zhang QL, Xu N, Huang ST, Cao H, Chen Q. WeChat-assisted pre-operative health education improves the quality of life of parents of children with ventricular septal defects: A prospective randomised controlled study. J Paediatr Child Health. 2021;57(5):664-9.
Reason for exclusion: Intervention and outcomes only for parents.

CONSIDERAÇÕES FINAIS

A cirurgia constitui uma experiência potencialmente stressante e ameaçadora, não só para a criança e adolescente, como também para a família. O enfermeiro, consciente das expectativas da família relativamente à cirurgia, características de desenvolvimento da criança/adolescente, tipo de cirurgia e suporte disponível, deve considerar as intervenções adequadas às suas necessidades de cada cliente/família durante o período perioperatório.

Na presente dissertação, avaliou-se a efetividade das intervenções educativas centradas na dor, ansiedade e comportamentos de crianças/adolescentes (3-19 anos) e na ansiedade dos seus pais no período perioperatório, através da condução de uma revisão sistemática da literatura com meta-análise.

Embora o objetivo inicialmente proposto tenha sido atingido com êxito, foram várias as dificuldades sentidas ao longo do percurso. Em primeiro lugar, no desenvolvimento do protocolo de revisão coerente e que não deixasse quaisquer dúvidas relativamente ao tópico a investigar e estratégias e recursos a utilizar. Em segundo lugar, devido ao processo moroso de triagem independente dos estudos identificados. A maioria dos estudos excluídos, embora interessantes e de alguma forma relacionados com a temática, não tinham uma componente educativa associada, mas sim distrativa. Por último, na elaboração do relatório e na interpretação dos resultados, com particular destaque para a meta-análise, que envolveu uma hercúlea pesquisa e aquisição de conhecimento na área, de forma a trasladar os resultados e responder, de forma assertiva, ao objetivo inicialmente delineado.

O estudo contribui para o conhecimento e prática baseada na evidência dos enfermeiros que trabalham em contextos perioperatórios pediátricos e que utilizam a filosofia de cuidados centrados na família como eixo de referência no seu cuidado. Desta revisão de efetividade conclui-se que as intervenções educativas são eficazes: na redução da ansiedade perioperatória de crianças/adolescentes e pais; na melhoria do comportamento da criança durante a indução anestésica; na redução da intensidade da dor pós-operatória. Não há evidência relativamente à efetividade destas intervenções na redução de *delirium* ao despertar ou na redução de comportamentos pós-operatórios indesejáveis, como dificuldade em dormir, falta de apetite, pesadelos e ansiedade de separação.

Pelo exposto, acredita-se que o estudo desenvolvido serve de fundamento para que as intervenções educativas centradas na família sejam consideradas nos contextos onde são prestados cuidados perioperatórios a crianças/adolescentes. Espera-se também que as organizações sejam sensíveis e recetivas para a necessidade de implementação destas intervenções visando os benefícios na gestão da ansiedade, dor e comportamentos de crianças/adolescentes e na gestão da ansiedade dos pais.

Decorrente do presente trabalho, surgem novos tópicos de interesse para investigação, como: Avaliar a eficácia de um programa educativo centrado na família na ansiedade, dor e comportamentos das crianças e dos adolescentes alvo de cuidados perioperatórios, assim como na ansiedade e satisfação dos seus pais; Compreender de que forma a ansiedade de crianças/adolescentes influencia a ansiedade dos pais e vice-versa, durante o período perioperatório; Avaliar o custo-efetividade de um programa educativo centrado na família, alvo dos cuidados perioperatórios em contexto pediátrico.

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