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Parental presence at anaesthesia induction: a systematic review.

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Abstract

Aim: To assess the effectiveness of parental presence for children undergoing surgical or diagnostic procedures under general anaesthesia.

Background: Those is favour of parental presence at anaesthesia induction argue that it is a simple, non-invasive, and cost effective means of facilitating smooth induction.

Design: Systematic review.

Methods: An electronic search of was carried out on sources published from 1946 to January 2012. Trials with healthy children scheduled for elective diagnostic and surgical procedures under general anaesthesia (age range 0 -16 years). The Cochrane collaboration's tool for assessing risk of bias was used for assessment of risk of bias. The Review Manager software was used to analyse and synthesize data. A random-effect meta-analysis was used when there was evidence of clinical and/or statistical heterogeneity.

Results/Findings: Nine trials involving 1021 children were eligible for inclusion. Only four were sufficient to be included in the meta-analysis. Parental presence alone at anesthesia induction had no statistically significant difference in the level of anxiety in both children and their parents either at separation or induction when compared with parental absence.

Conclusion: Significant debate still surrounds this issue and future trials should focus on the use of reliable and validated tools in assessing outcome measures.

Key words: parental presence, anaesthesia, systematic review

Summary Statements

What is already known about this topic?

- Parental presence at anaesthesia induction is believed to facilitate smooth induction. However, parental presence can have an impact on the both child and parent behaviour if the intubation is difficult.

- In accordance with the family-centered care paradigm, many institutions worldwide promote parental presence at induction.

What this paper adds?

- This review provides further evidence that parental presence alone at anesthesia induction results in no statistically significant difference in the level of anxiety in both children and their parents either at separation or induction when compared with parental absence.

- Premedication is more effective than parental presence in reducing the level of anxiety in children at induction and the anxiety level of parents at separation.

The implications of this paper for policy/practice/research/education:

- Future trials should focus on the use of reliable and validated tools to enable consistent reporting of outcome measures. Future trials should also consider the influence of parental presence at anesthesia induction on children at each developmental stage.

- Organisations can assist nurses in making informed decisions on parental presence at induction by developing written policies and providing in-service educational programs.

Introduction

There is evidence to suggest that over 5 million pediatric patients are scheduled for surgical or diagnostic procedures (such as tonsillectomy, adenoidectomy, myringotomy, ear debridement, laryngoscope, release of tongue tie, cleft palate, hernia repair and lesion excision) annually in the United States alone and perioperative anxiety has been identified to occur in approximately 50% to 75% of these children.[1-4] Frequently, this is due to the trauma of parental separation, separation from home and familiar surroundings, frightening operating room instruments, inadequate preoperative information or preparation, strangely dressed perioperative team members, hospital routines and the awareness of the health risks related to the surgical procedure.[1, 5-8]

Parental presence at anesthesia induction is defined as the interaction of the child, parent, anaesthesiologist and perioperative nurses in the induction room for the duration of anaesthesia induction.[9] The protection of one's offspring is a powerful parental biological instinct and it is unsurprising that separation of children from parents for medical procedures is stressful for both children and their parents.[5] Most children under the age of sixteen are not sufficiently psychologically and intellectually developed to deal with the psycho-trauma associated with pre-operative fears and anxieties, which are exacerbated when they are separated from their parents.[10]

Advocates of parental presence at anaesthesia induction argue that it is a simple, non-invasive, and cost effective means of facilitating smooth induction as it increases cooperation by children, prevents the trauma caused by parental separation, and improves parental satisfaction as well as decreasing the use of preoperative medication regimen.[11, 112] However, critics have identified concerns including the impact of parental anxiety on the child, unpredictable parental behaviours in the event of an evolving emergency situation evolves (e.g. difficult intubation), negative effects on trainee anaesthesiologist (e.g. loss of confidence) and interruptions in the

operation room routines due to parental presence.[5, 6, 12-18.] In line with the family-centred care paradigm and improving the patient experience, many institutions across many countries transfer the non-sedated child and his/her parent to the induction room with the intention of minimising distress for the child preoperatively.[19, 20] This practice is endorsed by the European Association for Children in Hospital (EACH) charter.[21]

Our specific research question was to assess the effectiveness of parental presence for children undergoing surgical or diagnostic procedures under general anaesthesia on preoperative anxiety in children and parents, emergence delirium, emergence agitation, delay emergence and parental satisfaction. This review differs from the Cochrane review by Yip et al (2009)[9], in two important ways; (i) this review includes all eligible trials included in the current review, which was assessed as up to December 2008, and extends the search period to 12th January 2012 and (ii) risk of bias assessment of all included trials was performed using the updated Cochrane Risk of Bias Assessment tool.[22]

Methods

Data Sources and Search Strategy

An electronic search of a range of sources was carried out via the following databases; Books@Ovid January 12, 2012, Ovid MEDLINE(R) 1946 to January Week 1 2012, Ovid Nursing Database 1948 to January Week 1 2012 and PsycINFO 1806 to January Week 2 2012.

(Table 1). Studies with the following criteria were included:

i. Trials: Randomized and quasi randomized control trials.
ii. Participants: Healthy children (who were American Society of Anesthesiologist (ASA) physical status I and II), scheduled for elective diagnostic and surgical procedures under

general anaesthesia and aged from birth to sixteen (0 -16) years without gender, weight or height restriction.

iii. Intervention: Parental presence at anaesthesia induction.

Exclusion criteria

Studies in which study participants were children with special needs and those who were classified following American Society of Anesthesiologist (ASA) physical status III and IV were excluded. These included:

i. critically ill and/or terminally ill children.
ii. children with special needs.

This is due to the potential of these children responding differently to parental presence at anaesthesia induction.

Our specific research question was to assess the effectiveness of parental presence for children undergoing surgical or diagnostic procedures under general anaesthesia on 1) children's preoperative anxiety, 2) parents' preoperative anxiety, 3) emergence delirium, 4) emergence delirium, 4) emergence agitation, 5) delay emergence, and 6) parental satisfaction. Two reviewers independently screened all citations against inclusion criteria and extracted data.

Risk-of-Bias Assessment

Each study was entered into the Review Manager Software [23] and independently examined by two reviewers for risk of bias using the Cochrane collaboration's tool for assessing risk of bias. The protocol of each included study was searched at Current Controlled Trials metaRegister of Controlled Trials [24] and the International Clinical Trials Registry Platform Search Portal[25] to identify protocols, which would allow an assessment as to whether trial author(s) reported all their pre-specified outcomes (selective outcome reporting bias).

Nine trials [12, 15-17, 26, 26, 27, 28, 29] were eligible for inclusion in this review (Table 2). The methodological quality of the nine trials included in the review was reasonable with most being judged at low risk of bias across most risk of bias domains. Allocation concealment was adequately reported in three trials[13, 26, 29] Only 2 trials measured delay emergence[15, 29] and parental in satisfaction[12, 15] in a format suitable for meta-analysis. None of the included trials reported emergence delirium and emergence agitation in a format suitable for meta-analysis. Due to the nature of the intervention i.e. parental presence, blinding of participants and personnel would not have been possible. One trial[16] reported that personnel were blinded to the premedication and parental absence group. Incomplete outcome data occurred in only two trials[12, 29.] Only one trial did not report its entire pre-specified outcomes.[27] No other bias was noted in the nine trials (Table 3).

Data Synthesis

Data from the included studies were entered into The Review Manager Software[23] and independently checked by two reviewers. Statistical heterogeneity was assessed using the X^2, Chi^2, I^2 and T^2 test statistics. Heterogeneity was considered significant where T^2 was greater than zero and either I^2 was greater than 30% or the p-value of the Chi^2 test for heterogeneity was less than 0.10. Fixed-effect meta-analysis was used for pooling data when there was an absence of clinical and statistical heterogeneity. A random-effect meta-analysis was used when there was evidence of clinical and/or statistical heterogeneity.

All outcomes of interest, 1) children's preoperative anxiety, 2) parents' preoperative anxiety, 3) emergence delirium, 4) emergence delirium, 4) emergence agitation, 5) delay emergence, and 6) parental satisfaction, were continuous data. Where outcomes were measured on

the same scale, the mean difference (MD) was computed with 95% confidence interval (95% CIs). The standardized mean difference (SMD) with 95% CIs was computed for trials that measured the same outcome but used different methods or scales.

Results

Our search strategy identified 102 citations. Two additional studies were identified through other sources i.e. the reference list of included studies. Of the 104 citations, two duplicates were identified and removed. After screening by titles (level 1) and titles and abstracts (level 2), 15 potentially relevant studies were identified. The full texts of two of these potentially relevant studies [30, 31] were not accessible despite exhausting inter-library resources. Of the remaining 13 full text papers, four were excluded following the assessment of full text studies (Figure 1 and Table 4) [14, 32-34]. Nine trials[12, 15-17, 27, 28, 29] were eligible for inclusion in this review (Table 2).

Five of the included trials compared parental presence against parental absence, [12, 15, 17, 26, 28] and four compared premedication and parental presence against parental absence. [13, 16, 27, 29] All the included trials included healthy children from birth to sixteen (0-16) years with American Society of Anesthesiologists (ASA) physical status I or II and scheduled for elective surgery under general anaesthesia. Children with ASA physical status III or IV were excluded in all the trials. One trial excluded children who had used Theophylline and sedative or hypnotic within the last month. [13] Three trials excluded children with prematurity and developmental delays.[13,16,29] The method of anaesthesia induction in seven trials was by mask inhalation[13,15,16,36,27,28,29] and the technique of anaesthesia induction was not reported in two trials. [12,17]

Outcome assessment

The outcomes measured across the included studies (Table 2) (e.g. child anxiety, parental anxiety and satisfaction) were measured using a variety of different scales. These included the Yale preoperative anxiety scale[35] and the modified Yale Preoperative Scale (Myas)[36] to measure child anxiety, and the State Trait Anxiety Inventory to measure parental anxiety.[37] A Likert scale and visual analogue scale (VAS) to measure parental satisfaction was specifically developed for two of the trials[15,16] The use of a variety of measures and at different time points, hindered the pooling of results of effect estimates of individual trials. Furthermore, one study's population was infants (aged 1-12 months)[12] and anxiety was measured indirectly using in the form of infants' behavioral distress.

With regards to sequence generation, one trial was a quasi-randomized control trial where randomization was by days of the week.[17] Two trials used computer-generated sequence generation[15, 29] and three used a random number table.[16, 26, 27] One trial did not report how the allocation sequence was generated.[28] Allocation concealment in one trial was inadequate as randomization was by days of the week.[17] Sealed envelopes were used to conceal allocation in three trials.,[13, 26, 29] One trial did not report how allocation was concealed.[12] Four trials did not provide sufficient information to inform a judgement.[15, 16, 27, 28] Due to the nature of the intervention i.e. parental presence, blinding of participants and personnel would not have been possible. However, one trial reported that personnel were blinded to the premedication group and control group (no intervention).[16] One trial reported that outcomes were assessed by a blinded observer[15] and all other included studies did not provide sufficient information to inform judgment. There were no missing data after randomization in seven trials. One trial reported that data were missing for 16% i.e. 10 participants due to surgery cancellation and missing data.[12] One trial also

reported that 21 participants did not receive the designated intervention.[29] Eight trials reported all outcomes identified in the method section in its findings but one trial did not report all outcomes identified in its methods section.[27] No other biases were noted in eight trials (Table xx).

Effects of interventions

Comparison 1. Parental presence versus no parental presence

There was no statistically significant difference on average in the level of anxiety of children either at separation (SMD -0.26, 95% CI -0.56 to 0.03) [16, 26, 27,29] or at induction (SMD 0.04, 95% CI -0.15 to 0.22) [12, 17, 26,29] as illustrated in Figures 2 and 3. On the whole, effect estimates demonstrated no statistically significant difference on average in the level of parental anxiety at separation (SMD 0.01, 95% CI -0.19 to 0.21)[12,15,16,17,27] or induction (SMD 0.19, 95% CI-0.14 to 0.52)[12,17] or between parents whose children were allocated to parental presence and those allocated to parental absence (Figures 4 and 5). The presence of parents at anaesthesia induction also had no statistically significant effect on parental satisfaction with the anaesthesiologist (MD 8.00, 95% CI -8.15 to 24.1) between parents whose children were allocated to parental presence and those allocated to parental absence.[12] There was no statistically significant difference in parental satisfaction with nursing care (MD 3.00, 95% -10.74 to 16.74) between parents whose children were allocated to parental presence and those allocated to parental absence.[12] There was no statistically significant difference in parental satisfaction with the overall perioperative care (MD -0.05, 95% -0.36 to 0.26).[12, 15] There was no statistically significant difference on average on delay emergence (SMD 0.18, 95% CI -0.16 to 0.51).[15, 29]

Comparison 2. Parental presence versus premedication only

There was no statistically significant difference in the levels of children's anxiety at separation between children allocated to parental presence and those allocated to premedication only (MD -2.00, 95% CI -6.67 to 2.67).[29] Premedication was found to be more effective than parental presence in reducing the level of anxiety in children at induction (MD 10.00, 95% CI 2.91 to 17.09).[29] Premedication was also found to decrease the anxiety level of parents at separation (MD 7.00, 95% CI 1.52- 12.48) in parents whose children were allocated to parental presence and those allocated to premedication.[16] One trial demonstrated no statistically significant difference in delay emergence (MD -7.00, 95% CI -19.45 to 5.45) in children allocated to parental presence and those allocated to premedication.[29]

Comparison 3. Parental presence versus Parental presence and premedication

There was no statistically significant difference in the level of anxiety at separation (MD -8.00, 95% CI -16.52 to 0.52) in children who were allocated to parental presence and those allocated to parental presence and premedication.[27] There was no statistically significant difference in the level of parental anxiety at separation (MD -1.00, 95% CI -7.29 to 5.29) in parents whose children were allocated to parental presence and those allocated to parental presence and premedication.[27]

A number of studies reported outcomes of interest using median and inter-quartile ranges or other measures effect, which were not possible to include within the meta-analysis. Reporting biases using funnel plots were not assessed due to each meta-analysis having less than the required 10 studies for adequate funnel plot asymmetry assessment.[38] It was intended to carry out subgroup

analysis if substantial heterogeneity was identified and if adequate data were available to compare the effects of parental presence on the outcomes between the following subgroups: (i) neonates versus other children; (ii) toddler versus other children; and (iii) young children versus other children. However, there was inadequate information available to perform any of these sub-group analyses.

Discussion

This review has demonstrated that parental presence alone at anesthesia induction had no statistically significant difference in the level of anxiety in both children and their parents either at separation or induction when compared with parental absence. Premedication was found to be more effective than parental presence in reducing the level of anxiety in children at induction and the anxiety level of parents at separation. There was no statistically significant difference in the level of anxiety in children who were allocated to parental presence and those allocated to parental presence and premedication. There was no statistically significant difference in the level of parental anxiety at separation in parents whose children were allocated to parental presence and those allocated to parental presence and premedication. Of note is that children with American Society of Anesthesiologist (ASA) physical status III and IV, children with history of prematurity, developmental delays, previous hospitalization or surgery were excluded in all included trials. It is possible that these groups of children might react differently to parental presence. This evidently leaves a knowledge gap in relation to preoperative anxiety in children. Independently, eight trials did not find parental presence as an effective intervention in reducing preoperative anxiety in children and one trial found that the presence of calm parents reduces the level of anxiety in some children. There may be various probable rationales for these findings. It is possible that parents

who consented to have their children randomized for parental presence, parental absence or predication groups were not bothered about these interventions and thus their reaction may have lowered the level of anxiety measures in the trials. Furthermore, most of the trials used different tools in assessing anxiety and also did not report numerical data. The trials included in the meta-analysis demonstrated the possibility of a selection bias given the low baseline levels of anxiety in all groups. Finally owing to the sort of intervention i.e. parental presence or parental absence, it was impossible to blind the participants and the personnel (observer) to the intervention. This could affect the results of the trials as people might change their reactions when they know they are being watched.

The findings from this review support those of Kain and his colleagues[16] i.e. premedication is more effective in decreasing preoperative anxiety in children than parental presence or parental absence. This review also supports those reported in Yip et al's Cochrane review[9] i.e. parental presence does not decrease perioperative anxiety in children but might be effective when used with other interventions (i.e. pharmacological or non- pharmacological). In addition, the review findings concur with the conclusions reached in a recent literature review[39] i.e. parental presence at anaesthesia induction is not an effective intervention in managing preoperative anxiety in children when used alone.

The review has a number of limitations. Most of the trials used different tools in assessing anxiety and also did not report numerical data, therefore hindering the statistical total score of various anxiety scales. The trials included in the meta-analysis demonstrated the possibility of a selection bias given the low baseline levels of anxiety in all groups. These low levels suggest that many children who had higher anxiety were excluded –probably because their parents or care- givers

wanted to choose the intervention rather than randomize. Finally owing to the sort of intervention i.e. parental presence or parental absence, it was impossible to blind the participants and the personnel (observer) to the intervention. This could affect the results of the trials as people might change their reactions when they know they are being watched.

Conclusion

This review has revealed that a significant debate still surrounds the issue of parental presence at anaesthesia induction. Future trials should focus on the use of reliable and validated tools in assessing anxiety, delay emergence, emergence delirium, emergence agitation and children and parent satisfaction. Reporting of outcomes in future studies should be consistent as inconsistency in reporting was identified across all the included trials in this review. Moreover, comparative effectiveness of various psychometric tools would also be helpful for future trials. Most of the trials excluded children with ASA physical status III and IV, children with history of prematurity, developmental delays, previous hospitalization or surgery. Consideration to their inclusion in future trials is needed because there is the possibility that they may react differently to parental presence. In order to avoid the unpleasant adverse effects that might be associated with pharmacological intervention (premedication such as Midazolam), future trials might focus on the effects of other non-pharmacological interventions such as clown doctors and hand held video games with parental presence in managing preoperative anxiety in children during anaesthesia induction.[9] It is known that the behavior or response of children varies depending on their developmental stage. However, the children who participated in the trials included in this review were wide ranging in age; therefore future studies should consider the influence of parental presence at anesthesia induction on children at each developmental stage and the use of age appropriate interventions in managing preoperative anxiety that supplement parental presence.

Despite the extensive use of parental presence at anesthesia induction, there is an absence of evidence of its effectiveness on preoperative anxiety in parents or children undergoing surgical or diagnostic procedures under general anesthesia. Nevertheless, one of the 'essentials of perioperative nursing' is addressing patients' need for communication with significant others [40] The lack of evidence-based information on the development and implementation of protocols for parental presence at anaesthesia induction may affect nurses in making informed decision about the intervention. Written policies regarding parental presence at anaesthesia induction, in-service educational programs and compliance checks would assist nurses in making informed decisions on parental presence. However, it is essential that once the protocol is implemented, a systematic assessment and review process is employed to ensure that would be valuable for children and their caregivers. The family is considered an integral part of the health care system. Therefore, in line with providing comprehensive individualized perioperative nursing care (family-centered health care) and desire to improve the patient experience, parents and children should be offered the choice of parental presence during anesthesia induction.

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Table 2. Included studies [ordered by year]

Study	Study design	No. of participants	Intervention	Outcomes Measured
Wright et al. 2010[26]	RCT	61	Parent presence (n= 30) Parent absence (n=31)	Child anxiety
Kazak et al. 2010[13]	RCT	60	Midazolam (n=20) Midazolam & Parent present (n=20) Parent presence (n=20)	Child anxiety Emergence agitation Delay emergence
Kain et al. 2007[29]	RCT	308	Parent presence (n=101) Midazolam (n=101) Parent absence (n=106) Advance behavioural (n=96)	Child anxiety Emergence delirium Delay emergence Parental anxiety
Kain et al. 2003[27]	RCT	80	Midazolam & Parent present (n=27) Parent presence (n=29) Parent absence (n=24)	Child anxiety Emergence delirium and time to discharge Parental anxiety
Amanor-Boadu 2002[28]	RCT	118	Parent presence (n=52) Parent absence (n=66)	Heart rate and behavior
Palermo et al 2000[12]	RCT	83	Parent presence (n=37) Parent absence (n=36)	Child distress Parent Anxiety Parental satisfaction
Kain et al. 1998[16]	RCT	93	Parent presence (n=29) Parent absence (n=26) Midazolam (n=26)	Child anxiety Initial postoperative excitement

				Time to discharge Parent anxiety Post hospitalization Behaviour
Kain et al. 1996[15]	RCT	84	Parent presence (n=43) Parent absence (n=41)	Child anxiety Time to discharge Parental anxiety Parental satisfaction
Bevan et al. 1990[17]	Quasi-RCT	134	Parent presence (n=67) Parent absence (n=67)	Global Mood Parental anxiety

Table 4: Excluded studies [ordered by year]

Study	Study design	No.	Rational for exclusion
Larder 2010[33]	RCT	300	The focus of parental presence was not at anaesthesia induction but it was in the post operative anaesthesia care unit (PACU). Preoperative anxiety in children was measured with the modified Yale preoperative anxiety scale but this was not reported.
Kain 2000[14]	RCT	103	The focus of intervention was on parental presence and sedative premedication versus sedative premedication
Page 1990[34]	RCT	263	This study evaluated the effect of Triclosfos and not parental presence as all the children has parental presence
Johnson 1988[32]	Quasi-RCT	134	This study reports Bevan et al 1990[17]

FIGURE 1

PRISMA 2009 FLOW DIAGRAM

PARENTAL PRESENCE AT ANAESTHESIA INDCUTION PARENTAL

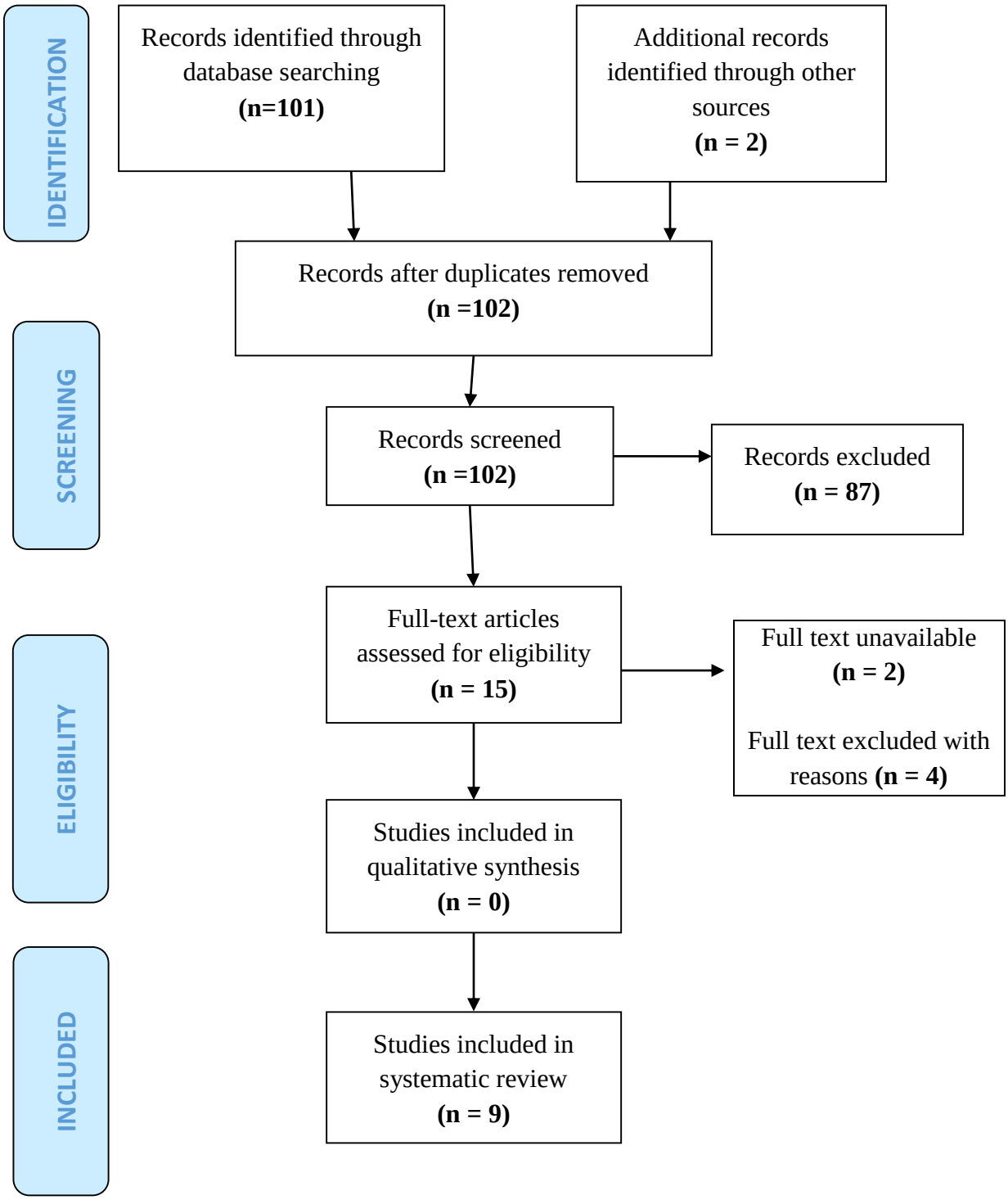

Figure 2 Child anxiety at separation

Study or Subgroup	Parental presence Mean	SD	Total	Parental absence Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
1.1.1 mYPAS								
Kain 2003	35	17	29	42	20	24	18.4%	-0.37 [-0.92, 0.17]
Kain 2007	35	16	94	36	16	99	34.0%	-0.06 [-0.34, 0.22]
Wright 2010	26.71	6.72	30	38.87	20.89	31	19.4%	-0.77 [-1.29, -0.25]
Subtotal (95% CI)			**153**			**154**	**71.8%**	**-0.36 [-0.79, 0.07]**
Heterogeneity: Tau² = 0.09; Chi² = 5.70, df = 2 (P = 0.06); I² = 65%								
Test for overall effect: Z = 1.63 (P = 0.10)								
1.1.2 GMS								
Bevan 1990	1.7	1.1	60	1.8	1.1	56	28.2%	-0.09 [-0.45, 0.27]
Subtotal (95% CI)			**60**			**56**	**28.2%**	**-0.09 [-0.45, 0.27]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.49 (P = 0.63)								
Total (95% CI)			**213**			**210**	**100.0%**	**-0.26 [-0.56, 0.03]**
Heterogeneity: Tau² = 0.05; Chi² = 6.22, df = 3 (P = 0.10); I² = 52%								
Test for overall effect: Z = 1.76 (P = 0.08)								
Test for subgroup differences: Chi² = 0.87, df = 1 (P = 0.35), I² = 0%								

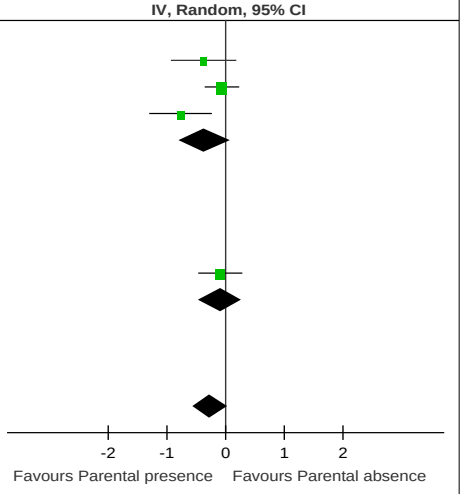

Figure 3 Child anxiety at induction

Study or Subgroup	Parental presence Mean	SD	Total	Parental absence Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
1.3.1 mYPAS								
Kain 2007	50	26	94	52	26	99	43.7%	-0.08 [-0.36, 0.21]
Wright 2010	54.18	27.9	30	52.75	24.27	31	13.8%	0.05 [-0.45, 0.56]
Subtotal (95% CI)			**124**			**130**	**57.5%**	**-0.05 [-0.29, 0.20]**
Heterogeneity: Tau² = 0.00; Chi² = 0.20, df = 1 (P = 0.66); I² = 0%								
Test for overall effect: Z = 0.36 (P = 0.72)								
1.3.2 MCBS								
Palermo 2000	2	0.5	37	1.8	0.5	36	16.2%	0.40 [-0.07, 0.86]
Subtotal (95% CI)			**37**			**36**	**16.2%**	**0.40 [-0.07, 0.86]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 1.67 (P = 0.09)								
1.3.3 GMS								
Bevan 1990	3.3	1.8	60	3.3	1.7	56	26.3%	0.00 [-0.36, 0.36]
Subtotal (95% CI)			**60**			**56**	**26.3%**	**0.00 [-0.36, 0.36]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.00 (P = 1.00)								
Total (95% CI)			**221**			**222**	**100.0%**	**0.04 [-0.15, 0.22]**
Heterogeneity: Tau² = 0.00; Chi² = 2.97, df = 3 (P = 0.40); I² = 0%								
Test for overall effect: Z = 0.40 (P = 0.69)								
Test for subgroup differences: Chi² = 2.77, df = 2 (P = 0.25), I² = 27.8%								

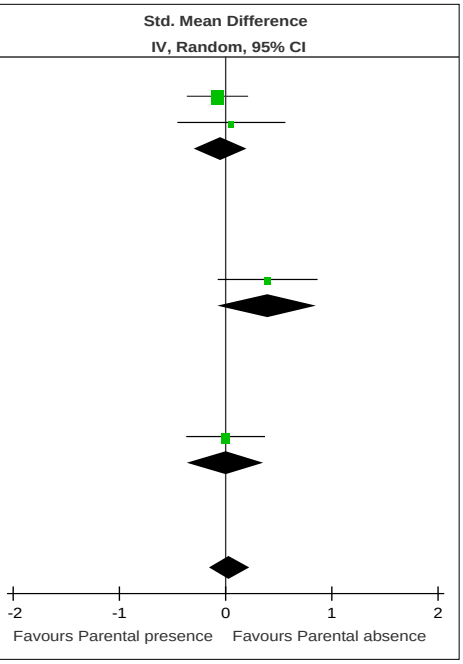

Figure 4 Parental anxiety at separation

Study or Subgroup	Parental presence Mean	SD	Total	Parental absence Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
1.11.1 STAI								
Kain 1996	43	12	43	46	12	41	21.5%	-0.25 [-0.68, 0.18]
Kain 1998	50	10	29	47	10	26	14.0%	0.30 [-0.24, 0.83]
Kain 2003	44	13	29	45	12	24	13.5%	-0.08 [-0.62, 0.46]
Palermo 2000	57.6	5.4	37	56.9	6.4	36	18.8%	0.12 [-0.34, 0.58]
Subtotal (95% CI)			**138**			**127**	**67.8%**	**-0.00 [-0.24, 0.24]**
Heterogeneity: Tau² = 0.00; Chi² = 2.79, df = 3 (P = 0.42); I² = 0%								
Test for overall effect: Z = 0.01 (P = 1.00)								
1.11.2 VAS								
Bevan 1990	42.8	32.2	60	41.9	28.9	65	32.2%	0.03 [-0.32, 0.38]
Subtotal (95% CI)			**60**			**65**	**32.2%**	**0.03 [-0.32, 0.38]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.16 (P = 0.87)								
Total (95% CI)			**198**			**192**	**100.0%**	**0.01 [-0.19, 0.21]**
Heterogeneity: Tau² = 0.00; Chi² = 2.81, df = 4 (P = 0.59); I² = 0%								
Test for overall effect: Z = 0.09 (P = 0.93)								
Test for subgroup differences: Chi² = 0.02, df = 1 (P = 0.89), I² = 0%								

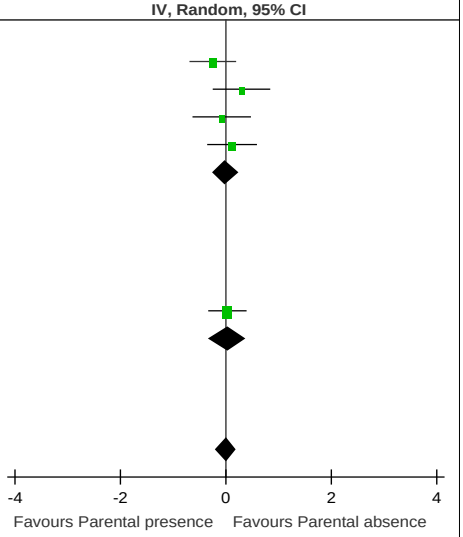

Figure 5 Parental anxiety at induction

Study or Subgroup	Parental presence Mean	SD	Total	Parental absence Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
1.10.1 STAI								
Palermo 2000	47.2	4.8	37	45.2	5.2	36	39.9%	0.40 [-0.07, 0.86]
Subtotal (95% CI)			**37**			**36**	**39.9%**	**0.40 [-0.07, 0.86]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 1.67 (P = 0.09)								
1.10.2 VAS								
Bevan 1990	54.1	36.4	60	52.3	33.1	65	60.1%	0.05 [-0.30, 0.40]
Subtotal (95% CI)			**60**			**65**	**60.1%**	**0.05 [-0.30, 0.40]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.29 (P = 0.77)								
Total (95% CI)			**97**			**101**	**100.0%**	**0.19 [-0.14, 0.52]**
Heterogeneity: Tau² = 0.02; Chi² = 1.35, df = 1 (P = 0.25); I² = 26%								
Test for overall effect: Z = 1.12 (P = 0.26)								
Test for subgroup differences: Chi² = 1.35, df = 1 (P = 0.25), I² = 25.7%