

# Aromatherapy for Pain, Emotional Distress and Sleep Quality in Cancer Patients Receiving Hospice Care: A Meta-Analysis

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# Background

- Cancer has been the No. 1 leading cause of death for the past 30+ years in Taiwan.
- Individuals with cancer not only experience physiological discomforts but also psychological disturbances.
- In addition to conventional medical therapies, complementary therapies are also widely accepted.
- Aromatherapy is now one of the mostly used therapies in palliative care unit

# Pain in Patients With Cancer

- is one of the most feared and burdensome symptoms.
- A metaanalysis of pain prevalence by van den Beuken-van Everdingen, de Rijke, Kessels, Schouten, van Kleef & Patijn in 2007:
  - 53% (95% CI = 43% to 63%) of patients at all disease stages
  - Of the patients with pain, > 1/3 graded their pain as moderate or severe.
- > 50% continue to experience pain with pain treatment

# Emotional Disturbance in Patients With Cancer

- Prevalence reported from different studies ranged from 15-77%, as cancer advanced, the prevalence increased.
- Depression and anxiety are most seen psychological status.
- pharmacological management is the primary intervention

# Sleep Disturbance in Patients With Cancer

- 30-50% complain sleep disturbance
- Related factors include fatigue, altered emotion, pain and anxiety
- Pharmacological management is the primary choice of treatment
- Cognitive behavioral therapy is also used, but with its limitations.

# Aromatherapy

- the practice of using the natural oils extracted from flowers, bark, stems, leaves, roots or other parts of a plant to enhance psychological and physical well-being.
- A form of alternative medicine, aromatherapy is gaining momentum.
- used for a variety of applications
  - pain relief
  - mood enhancement
  - increased cognitive function

# Aromatherapy

- Evidences show benefits of aromatherapy in:
  - Sleep quality ( Brownfield, 1998; Lewith, Godfrey, & Prescott, 2005 )
  - Pain (Soon, Hwuang, Sun, Wang, Chang , 2005 ; Anderson, Balchin, & Smith, 2000; Ro, Ha, Kim,& Yeom, 2002 )
  - Stress/ Anxiety ( ( Chiu , 2003 ; Imura, Misao, & Ushijima, 2006; Kite et al., 1998; Wilkinson, Aldridge, Salmon, Cain, & Wilson, 1999 )

# Purpose of This Study

- Using a **metaanalysis** approach to determine the effects of aromatherapy on (a) **pain**, (b) **emotional distress** and (c) **sleeping quality** in cancer patients receiving hospice care

# Step 1: Ask An Answerable Question (A PICO Question)

## P-Patient

- Patients with cancer

## I-Intervention

- aromatherapy

## C-Comparator

- Routine care or no aromatherapy

## O-Outcome

- pain
- Emotional disturbance
- Sleep Quality

**Criteria for considering studies for this review**

**Step 2: Tracking down the best evidence with which to answer that question**

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# Inclusion Criteria

- Studies published in 1967 – 2011
- RCTs or CCTs
  - Non-randomized controlled trials and before and after studies will be considered in the absence of RCTs
- Individuals with cancer and receiving hospice care as study participants
- Used aromatherapy as intervention
- Pain, sleep quality and/or emotional distress as study outcome(s)
- Study reported necessary data for conducting metaanalysis

# Exclusion Criteria

- Studies were conducted with cancer patient who were not at hospice care
- Systematic review
- Duplicate studies (only one study would be included in final data analyses)

# Search strategy

- Electronic search
  - A total of 7 databases were searched
  - English
    - CINAHL
    - MEDLINE
    - The Cochrane Library
  - Chinese
    - National Digital Library of Theses and Dissertations in Taiwan (NDLTD)
    - Index to Taiwan Periodical Literature System (PerioPath)
    - Chinese Electronic Periodical Services
    - Government Research Bulletin
- Hand search

# Keywords Used

- All terms in both Chinese and English
  - Aromatherapy
  - Cancer patients
  - Hospice care
  - Pain
  - Sleep Quality
  - Emotional distress
- MeSH database to determine any synonymous
- Boolean operator were used

# MeSH Terms

Keywords	Mesh Database
Aromatherapy	Aromatherapy
Hospice Care	Hospice End Of Life Terminal Care Palliative Care
Pain	Chronic Pain
Emotional Distress	Depression Irritable Mood Anxiety
Sleep Quality	Insomnia Sleep Disturbance

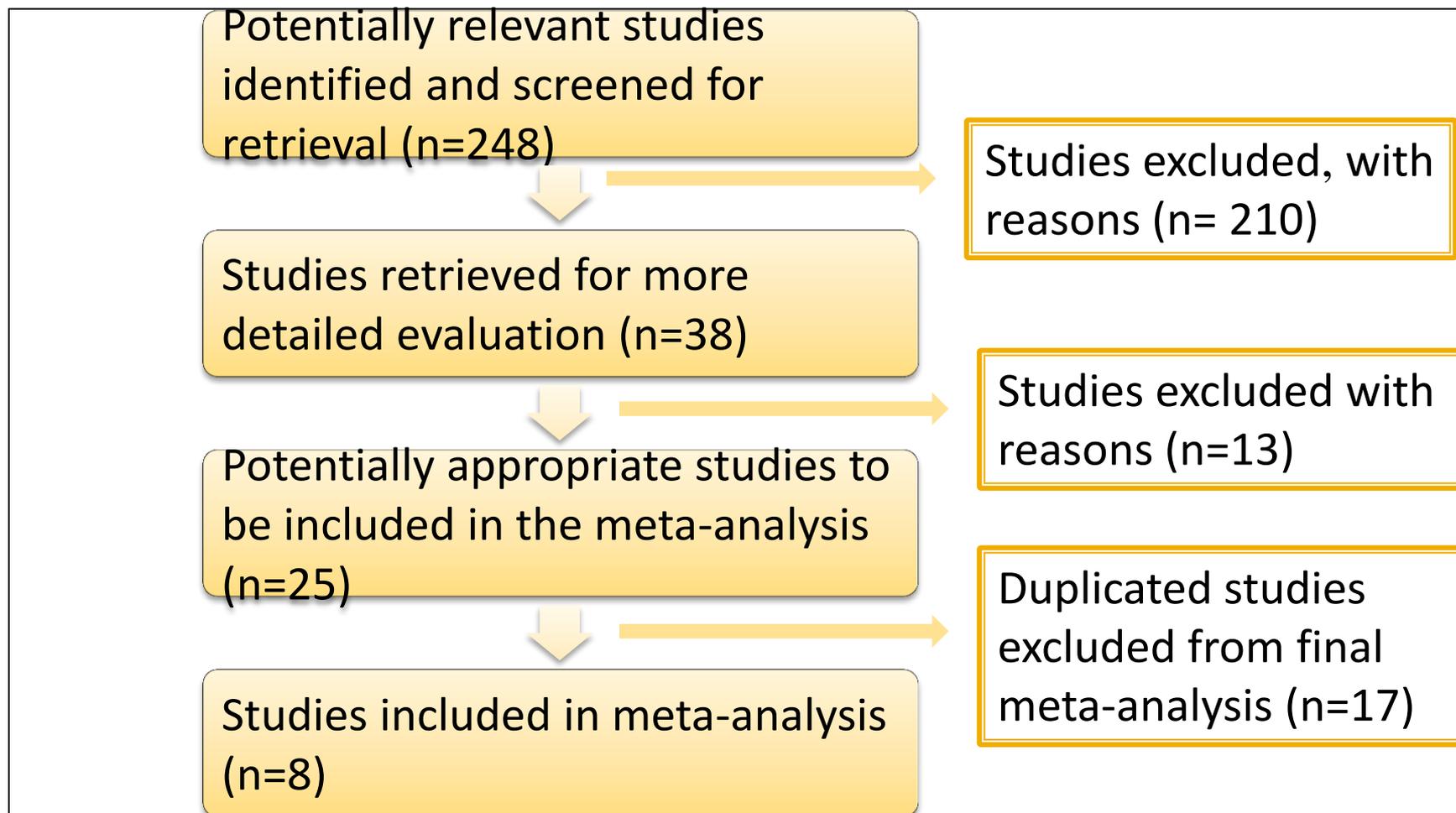
# Selection Of Studies

- One review author screened the title, abstract and descriptors of identified studies for possible inclusion.
- From the full text, two authors independently assessed potentially eligible trials for inclusion
- Differences were resolved by consensus, or 3rd third party adjudication.
- 8 studies were included in the final data analysis

# Results of study selection

Database	No. of hits	No. met inclusion criteria	No. of duplication and were deleted	No. included in final appraisal
CINAHL	79	7	0	7
MEDLINE	4	4	3	1
Cochrane Library	14	13	13	0
CEPS	39	0	0	0
GRB	39	0	0	0
NLTLD in Taiwan	63	0	0	0
PerioPath	10	0	0	0
<b>Total</b>	<b>248</b>	<b>24</b>	<b>16</b>	<b>8</b>

# Flow Diagram for Study Selection



**Step 3: Critically appraising  
that evidence for its validity,  
impact, and applicability**

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# Assessment Of Methodological Quality

- Methodological qualities of included studies were evaluated using The Cochrane Collaboration's Tool for Assessing Risk of Bias(2009)
  - A domain-based evaluation tool
    - 'Low risk' of bias
    - 'High risk' of bias
    - 'Unclear risk' of bias
  - 2 reviewers critically appraised each included studies, independently.
  - Inter-rater Kappa ranged 41.5~81% ( $p < .05$ )

# The Cochrane Collaboration's Tool for Assessing Risk of Bias

## Selection bias

- Random sequence generation.
- Allocation concealment.

## Performance bias

- Blinding of participants and personnel

## Detection bias

- Blinding of outcome assessment

## Attrition bias

- Incomplete outcome data

## Reporting Bias

- Selective reporting

## Other Bias

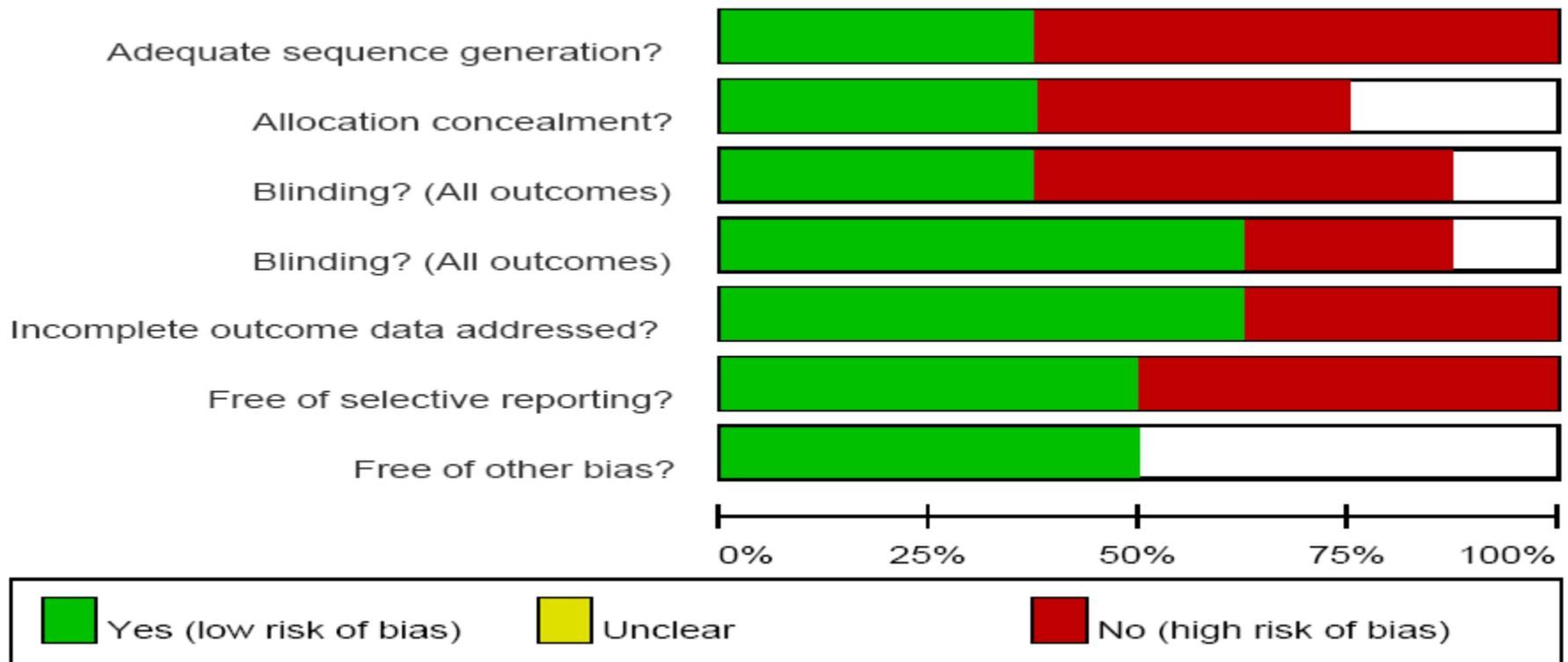
- Other sources of bias

# Quality of Included Study

	Adequate sequence generation?	Allocation concealment?	Blinding? (All outcomes)	Blinding? (All outcomes)	Incomplete outcome data addressed?	Free of selective reporting?	Free of other bias?
Chang, 2008	-				+	+	+
Kite et al, 1998	-		-	+	-	-	
Louise et al, 2002	-	-	-	+	+	-	+
Soden et al, 2004	+	+	+	+	+	+	
Stringer et al, 2011	-	-	+	+	-	-	
Wilcock et al, 2004	-	+	-	-	-	+	
Wilkinson et al, 1999	+	-	-	+	+	+	+
Wilkinson et al, 2007	+	+	+	-	+	-	+

■ Moderate level of quality for included studies

# Quality of Included Study



**Step 4: Synthesize the  
available evidence**

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# Data Collection

- Data extracted from the publications included
  - Study design
  - Intervention
  - Participants' characteristics
  - methodological quality
  - outcome measures
- Data were extracted using a pre-tested extraction form by two independent reviewers

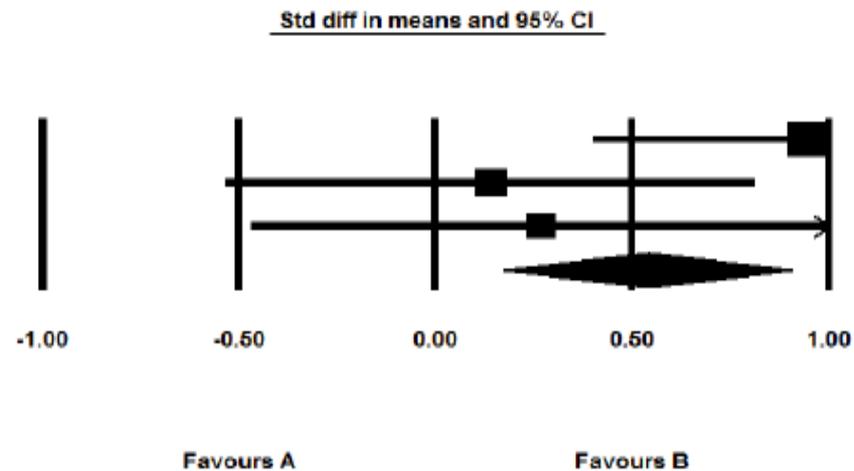
# Data Analysis

- Comprehensive Meta Analysis version 2.2 (Biostate, 2006) was used to analysis statistical data extracted from retrieved articles and to conduct meta-analysis.
  - i.e., sample size, mean, change score, SD, *t*, *p values*
- Assessment of heterogeneity between studies
- Effects of aromatherapy on study outcomes
  - Standard difference in mean, 95% confidence intervals (CI) and *p*-values were calculated for each of studies as well as combined effects.

# Result: Effect On Pain

Model	Test of null (2-Tail)		Heterogeneity				Tau-squared			
	Z-value	P-value	Q-value	df (Q)	P-value	I-squared	Tau Squared	Standard Error	Variance	Tau
Fixed	2.885	0.004	4.037	2	0.133	50.452	0.111	0.220	0.048	0.333
Random	1.820	0.069								

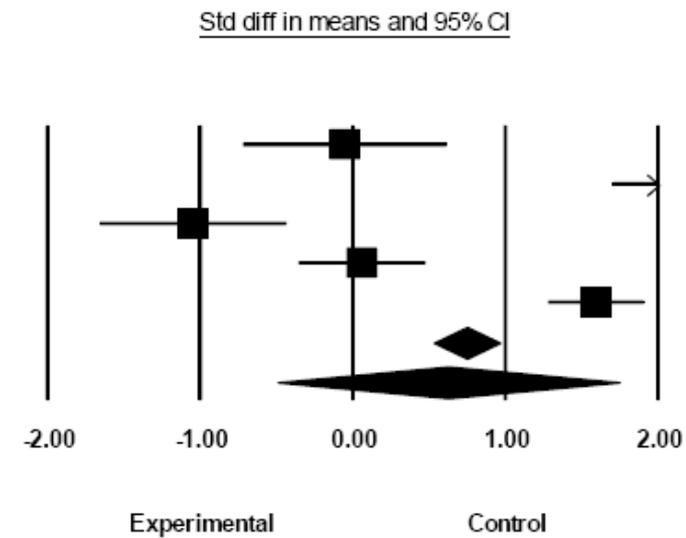
Model	Study name	Statistics for each study						
		Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
	Chang, 2008	0.947	0.277	0.077	0.404	1.490	3.418	0.001
	Louise et al., 2002	0.141	0.343	0.118	-0.532	0.814	0.410	0.682
	Soden et al., 2004	0.268	0.375	0.141	-0.467	1.003	0.714	0.475
Fixed		0.539	0.187	0.035	0.173	0.906	2.885	0.004



# Result: Effect On Sleep Quality

Model	Test of null (2-Tail)		Heterogeneity				Tau-squared			
	Z-value	P-value	Q-value	df (Q)	P-value	I-squared	Tau Squared	Standard Error	Variance	Tau
Fixed	6.706	<0.001	89.814	4	<0.001	95.546	1.522	1.325	1.756	1.234
Random	1.087	0.277								

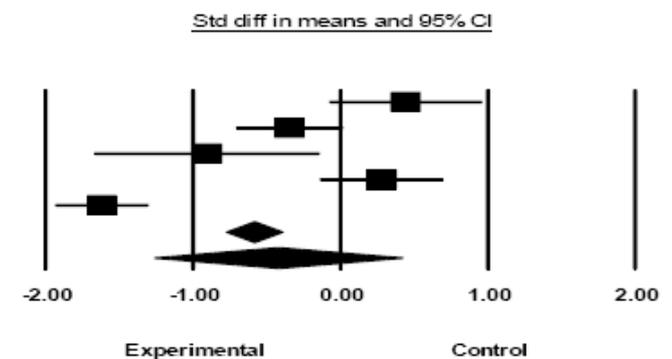
Model	Study name	Statistics for each study						Z-Value	p-Value
		Std diff in means	Standard error	Variance	Lower limit	Upper limit			
	Louise et al., 2002	-0.052	0.343	0.118	-0.724	0.621	-0.150	0.880	
	Soden et al., 2004	2.707	0.516	0.266	1.697	3.717	5.251	0.000	
	Wilcock et al., 2004	-1.047	0.314	0.099	-1.663	-0.431	-3.329	0.001	
	Wilkinson et al., 1999	0.060	0.214	0.046	-0.360	0.481	0.281	0.779	
	Wilkinson et al., 2007	1.595	0.163	0.026	1.276	1.914	9.799	0.000	
Fixed		0.741	0.111	0.012	0.525	0.958	6.706	0.000	
Random		0.621	0.571	0.326	-0.498	1.739	1.087	0.277	



# Result: Effect On Anxiety

Model	Test of null (2-Tail)			Heterogeneity		
	Z-value	P-value	Q-value	df (Q)	P-value	I-squared
Fixed	-6.160	<.001	73.325	4	<.001	94.545
Random	-1.000	0.317				

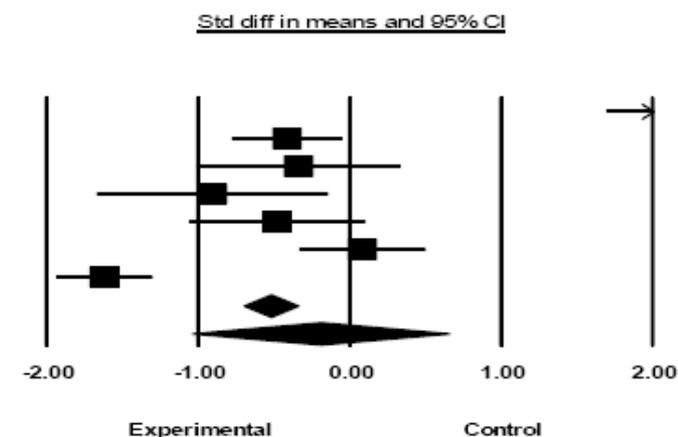
Model	Study name	Statistics for each study						
		Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
	Chang, 2008	0.444	0.266	0.071	-0.077	0.965	1.669	0.095
	Kite et al., 1998	-0.344	0.187	0.035	-0.711	0.023	-1.839	0.066
	Soden et al., 2004	-0.905	0.392	0.154	-1.673	-0.137	-2.310	0.021
	Wilkinson et al., 1999	0.279	0.215	0.046	-0.144	0.701	1.293	0.196
	Wilkinson et al., 2007	-1.618	0.163	0.027	-1.938	-1.297	-9.904	0.000
Fixed		-0.592	0.096	0.009	-0.780	-0.404	-6.160	0.000
Random		-0.428	0.428	0.184	-1.268	0.411	-1.000	0.317



# Result: Effect On Depression

Model	Test of null (2-Tail)		Heterogeneity			
	Z-value	P-value	Q-value	df (Q)	P-value	I-squared
Fixed	-5.823	<0.001	125.656	6	<.001	95.225
Random	-0.459	0.646				

Model	Study name	Statistics for each study						Z-Value	p-Value
		Std diff in means	Standard error	Variance	Lower limit	Upper limit			
	Chang, 2008	2.363	0.342	0.117	1.692	3.034	6.903	0.000	
	Kite et al., 1998	-0.412	0.188	0.035	-0.780	-0.044	-2.195	0.028	
	Louise et al., 2002	-0.337	0.345	0.119	-1.014	0.340	-0.974	0.330	
	Soden et al., 2004	-0.905	0.392	0.154	-1.673	-0.137	-2.310	0.021	
	Wilcock et al., 2004	-0.478	0.299	0.089	-1.064	0.109	-1.597	0.110	
	Wilkinson et al., 1999	0.085	0.215	0.046	-0.335	0.506	0.398	0.691	
	Wilkinson et al., 2007	-1.618	0.163	0.027	-1.938	-1.297	-9.904	0.000	
Fixed		-0.527	0.090	0.008	-0.704	-0.349	-5.823	0.000	
Random		-0.198	0.432	0.187	-1.045	0.649	-0.459	0.646	



# Discussion

- Limitations of the study
  - Publication bias
    - Inconsistent results of Funnel Plot, Egger Regression and Fail –Safe Number
  - Study quality
    - Non-RCT
    - Blinding
    - Small sample size
  - Confounding factors
    - Homogeneity in population?

# Publication Bias

	Pain	Anxiety	Depression	Sleep Quality
Funnel Plot	x	✓	x	✓
Egger Regression > .05	x	x	x	x
N.f.s > Tolerance Level	✓	x	x	x
# of observed studies	3	5	7	5
# of studies needed to correct publication bias	3	28	18	32

“✓” meeting criterion : “x” Not meeting criterion

# Bonus: From a Qualitative Perspective

- Dunwoody L ; Smyth A ; Davidson R (2002)
- Participants (n = 11: 10 females) were interviewed
  - at the time they just finished a block of six 1 hour once weekly sessions of aromatherapy
- Focus group
  - Using semi-structured interview

# Bonus: From a Qualitative Perspective

- Eight themes emerged from the analysis

de-stressing effects

the counseling role of the aromatherapist,

Aromatherapy as a reward

patient empowerment

communication through touch

negative aspects of the service

concerned with security of context (where the aromatherapy took place)

# Conclusion

- The current strength of evidence is weak and more well-designed studies are strongly recommended.
- Clinical application should take individuals' differences into consideration