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Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

MX 5090 FINAL YEAR RESEARCH PROJECT

BIRTH PREPARATION:
IMPACTS ON THE BIRTHING OUTCOMES

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STUDENT'S DECLARATION

AUTHOR'S DECLARATION:

I confirm that this project submission is my own original work. All sources and publications have been recognized and referenced appropriately.

Signed:

FATIMAH AZZAHRA BADARUDDIN

INTRODUCTION

Childbirth is a natural phenomenon that brings joy to most women. However, labour is often traditionally related to pain. The anticipation of labour itself can create anxiety for many patients[1], and this affects approximately 5-20% of pregnant women.

Labour pain

Pain is a body's physiological and psychological response to nerve stimuli. Labour pain is influenced by multiple factors[2-3]. Different individuals perceive pain variably. Very rarely, some women in certain cases had an unexpected delivery and were pain-free during labour[4]. At the other extreme, childbirth had been described as the most severe form of pain a woman ever experienced in her life[5]. The strength of labour pain is comparable in intensity and severity to arthritis and cancer[6]. Emotional reactions can also affect pain experience[7-8]. Fear, anxiety and feeling loss of control increases the intensity and incidence of pain[7,9-10], which may result in postnatal depression, post-traumatic stress disorder, future caesarean section and a reluctance to have more children[7,11-14].

Antenatal education

Birth preparation is well-recognised as an important tool in aiding women to prepare for an often painful event[15]. In most high income countries, birth preparation courses are included in current healthcare practices[16]. Antenatal education programmes aim to provide ways to cope with pain and stress during labour, promoting women's confidence for childbirth[17]. Most women joined antenatal classes to gain information on physiological changes during pregnancy, ease anxiety, and discuss on different options and complications during labour[18].

Currently, very few research studies have been done to assess the efficacy of antenatal education programmes. Two studies by Artieta-Pinedo et al.[19] and Paz-Pascuale et al.[20] showed reduced anxiety in women attending courses in comparison to non-attenders. Nonetheless, a Cochrane systematic review revealed these courses demonstrated no consistent effect, but only an inclination towards better knowledge, confidence and competence was deduced in small studies[21]. Most healthcare professionals recommend the courses[18], although the aims, processes and contents of

each antenatal course differ significantly[22]. Since there are no widely adopted standards or guidelines available, it is difficult to evaluate the antenatal courses.

Hypnosis

Hypnosis has been practised to reduce patient's anxiety and providing pain relief in surgery[23-25] for decades. Few studies claim that hypnosis can be safely use in pregnancy and childbirth[26-28]. For many years, people have misinterpreted hypnosis, but recently, hypnotherapy has become a growing area of clinical research[29-31]. Hypnosis is a state of focused attention, reduced peripheral awareness and enhanced receptivity to verbal or non-verbal communication, which is known as suggestion[32-33]. Hypnotherapy is interpreted as the use of suggestions during hypnosis to achieve therapeutic aims like lowering pain and anxiety in labour. Hypnosis may exert positive influence on maternal and neonatal outcomes such as labour pain, duration of birth, perinatal and postnatal complications and spontaneous delivery. Systematic review evidence proved that clinical hypnosis reduces the request for pharmacological analgesia, lesser labour augmentation and promotes spontaneous delivery[34-36].

Mindfulness

Mindfulness is defined as the awareness that arises from paying attention, on purpose, in the present moment, and non-judgementally[37]. By practicing non-judgemental quality of attention during meditation, one can observe their physical sensations, thoughts and emotions, accepting them as they are, thus, reducing the automatic reactions to them[38]. Mindfulness practice helps the practitioner realize that physical sensations, emotions and thoughts are continuously changing variably, as well as promoting compassion and kindness towards oneself and others[39].

Mindfulness-based programmes[40-41] have become widely used in clinical settings and are effective for physical and psychological conditions including chronic pain[42], depression, anxiety and stress[43]. Some studies have showed effectiveness of mindfulness-based programmes in reducing perinatal anxiety, depression and the severity of labour pain in pregnant women of various populations[44-46].

Gentlebirth

Gentlebirth is a multimodal birthing program that teaches expectant mother and their partners brain-training techniques (mindfulness, hypnosis and sports psychology) to promote self-efficacy, non-pharmacologic coping strategies and a positive mindset for pregnancy, birth and parenthood. Its overall aim is to reduce fear and anxiety and promote a more manageable labour and positive birth experience.

The overall aim of this study was to assess maternal's expectations entering labour, their experience and potential labour outcomes after conventional midwife-led preparational course in comparison to Gentlebirth. Both matenal's labour expectations and experience were evaluated using Childbirth Expectation Questionnaire (1991 Gupton et al.)[47] and Childbirth Experience Questionnaire (2010 Dencker et al.)[48] respectively.

METHODS & MATERIALS

This is a prospective cohort study on 200 pregnant women who either attended standard midwife-led antenatal classes in Cork University Maternity Hospital (CUMH) or Gentlebirth course from April to October 2016.

Course design

200 pregnant women were recruited in the study; 100 control group mothers who attended standard antenatal class in CUMH, consisting of 50 antenatal and 50 postnatal women, while the remaining 100 women underwent Gentlebirth course, consisting of 50 antenatal and 50 postnatal mothers.

Different senior midwives conducted the midwife-led classes. The classes took place once for two weeks and lasted for 2 hours each week. These sessions had mainly informational content regarding pregnancy, birth and newborn child.

The Gentlebirth workshops were carried out by a Gentlebirth instructor in Cork. The workshops lasted for two days and participants were also given information regarding pregnancy, birth and parenting, as well as were taught brain-training techniques on the form of mindfulness, hypnosis and sports psychology. Women also used the Gentlebirth app to practise their training in pregnancy and labour.

Participants

Women were eligible to take part in the study if they were pregnant in their second trimester or onwards, with cephalic presentation, aged at least 18, have adequate English command and were either planning or have had vaginal delivery. Those with breech presentation were excluded.

Materials

The data was collected by two sets of questionnaires. The demographic questionnaire consisted of 17 questions on personal, social and obstetric particulars that had been tailored for the study.

Childbirth Expectation Questionnaire[47]

This questionnaire is a copyright of 1991 Gupton et al. used to assess maternal childbirth expectation. It is a 35 item, 5-point likert scale that ranged from "strongly agree" to "strongly disagree" among which 19 items were negatively worded and required reversed scoring. Each participant received a total score ranging from 35-175. High scores indicated positive labour expectation. The instrument composed of 4 main domains; woman's expectation to receive support from partner/coach, expectation to receive nurses' support, expectation to cope with pain and expectation to have minimum medical intervention.

Table 1*: Childbirth Expectation Questionnaire (CEQ) domains and included items*

Domain	Items
Significant other	My partner/coach will be happy and excited
	My partner/coach will feel quite helpless*
	I will ask my partner/coach for help

	I will feel comforted by the presence of my partner/coach
	My partner/coach will tell me what is going on
	My opinion or that of my partner/coach will be sought for all major medical decisions
	I will avoid telling my partner/coach what I am feeling*
Nursing support	The nurses will be kind to me
	I will avoid seeking help from the nurses*
	I will feel reassured by the nurses' presence
	The nurses will spend little time with me*
	My plans for birth will be ignored by the nurse*
	The nurses will offer me encouragement
	I will receive personal attention from the nurses
Pain/coping	I will be immobilized by the pain of labor*
	I will be able to cope with labor
	I will worry about the severity of labor pain*
	I will be afraid of panicking*
	I will experience discomfort but not unbearable pain
	I will feel intense pain*
	I will be afraid of being a coward*
	I will be able to relax during labor
	The pain of labor will be agonizing*
	I will be scared when I think about the pain of labor*
	I will be embarrassed by my behavior*

Intervention	I will be required to have routine procedures even if I don't want them*
	There is little chance that I will end up having a caesarean section
	Lots of medical equipment and machinery will be used*
	I will have a childbirth free of medical intervention
	I will want to have fetal monitoring*
	Forceps will be used*
	I will refuse to have any procedures I consider unnecessary
	I will use anesthetics and/or pain killing drugs*
	The doctor will make most of the decisions*

*Reverse scoring

Childbirth Experience Questionnaire[48]

This questionnaire is a copyright of 2010 Dencker et al. used to evaluate maternal childbirth experience. It is a 22 item, in which 19 of the items were a 4-point likert scale ranging from "totally agree=1" to "totally disagree=4". Memory of labour pain, sense of security and control were assessed with visual analogue scale (VAS). The VAS-scales scores were transformed to categorical values, 0-40=1, 41-60=2, 61-80=3 and 81-100=4. Ratings of positively worded statements and the pain items were reversed so that higher scores reflect more positive scoring. Higher score indicates more positive birth experience. This instrument assessed 4 main domains namely "own capacity", "professional support", "perceived safety" and "participation".

***Table 2**: Childbirth Experience Questionnaire (CEQ) domains and included items*

Domain	Items
Own capacity	Labour and birth went as I had expected

	I felt strong during labour and birth
	I felt capable during labour and birth
	I was tired during labour and birth
	I felt that I handled the situation well
	As a whole, how painful did you feel childbirth was? *
	As a whole, how much control did you feel you had during childbirth? *
Professional support	My midwife devoted enough time to me
	My midwife devoted enough time to my partner
	My midwife kept me informed about what was happening during labour and birth
	My midwife understood my needs
	I felt very well cared for by my midwife
Perceived safety	I felt scared during labour and birth
	I have many positive memories from childbirth
	I have many negative memories from childbirth
	Some of my memories during childbirth make me feel depressed
	My impression of the team's medical skills made me feel secured
	As a whole, how secure did you feel during childbirth? *
Participation	I felt I could have a say whether I could be up and about or lie down
	I felt I could have a say in deciding my birthing position
	I felt I could have a say in choice of pain relief

* VAS-scale with anchors

Procedure

The participants were selected based on the aforementioned criteria. They would sign a consent form approved by Clinical Research Ethics Committee (CREC) Cork, once they agreed to participate.

50 women in the antenatal control group were given the validated Childbirth Expectation Questionnaire[47] (1991 Gupton et al.) and demographic questionnaire during the antenatal class. 50 postnatal control group women were asked to complete the validated Childbirth Experience Questionnaire[48] (2010 Dencker et al.) in the postanatal wards in CUMH.

Cork Gentlebirth instructor had helped to recruit 100 Gentlebirth antenatal and postnatal mothers. The links to the online questionnaire via SurveyMonkey were emailed to them either after the workshops or post-delivery.

Statistical analysis

The data was analysed using SPSS version 22. Descriptive studies such as mean were used and differences between groups were tested by using cross tabulations chi-square test. Two sided p-values were reported for all tests and a value of <0.05 were regarded as significant.

Ethics approval

Ethical approval was granted by Clinical Research Ethics Committee (CREC) of the Cork Teaching Hospitals.

RESULTS

Demographic characteristics

Antenatal

100 antenatal women between the ages of 20 and 46 took part in the study with a mean age of 32.8 (control group) and 33.6 (Gentlebirth). Most women in both

groups were nulliparous and married. Majority women in the control group attended antenatal class in third trimester, while Gentlebirth mums were in their second trimester. There was no statistically difference between both groups in regard of patient's characteristics; age, parity and marital status.

Table 3: *Baseline characteristics of the study population for control group (n=50) and Gentlebirth (n=50) (n.s. = no statistically significant difference, p>0.05)*

ANTENATAL	CONTROL GROUP	GENTLEBIRTH	p-value
Mean age (year)	32.8 (range 22-42)	33.6 (range 20-46)	n.s.
Mean parity	0.26 (range 0-3)	0.52 (range 0-3)	n.s.
Mean gestation (week)	33 (range 30-36)	24.9 (range 20-29)	n.s.
Marital status	78% married, 22% single in relationship	80% married, 20% single, in relationship	n.s.

Postnatal

100 postnatal women between the ages of 22 and 44 participated in the research with a mean age of 33.8(control group) and 33.6(Gentlebirth). Most women in both groups were primips, married and delivered at full term. Almost half women in the control group were induced at labour, while only a quarter of Gentlebirth mums experienced labour induction. (p<0.05) More than half of control group women used epidural as compared to only a quarter in Gentlebirth. (p<0.01) Almost all Gentlebirth women exclusively breastfed in comparison to only two-thirds of control group breastfed. (p<0.01) There was no statistically significant difference between both groups in regards of age, parity, marital status, labour intervention, perineal injury, intrapartum complications, baby's birthweight and gender, and admission to NICU.

Table 4: *Baseline characteristics of the study population for control group (n=50) and Gentlebirth (n=50) (n.s. = no statistically significant difference, p>0.05)*

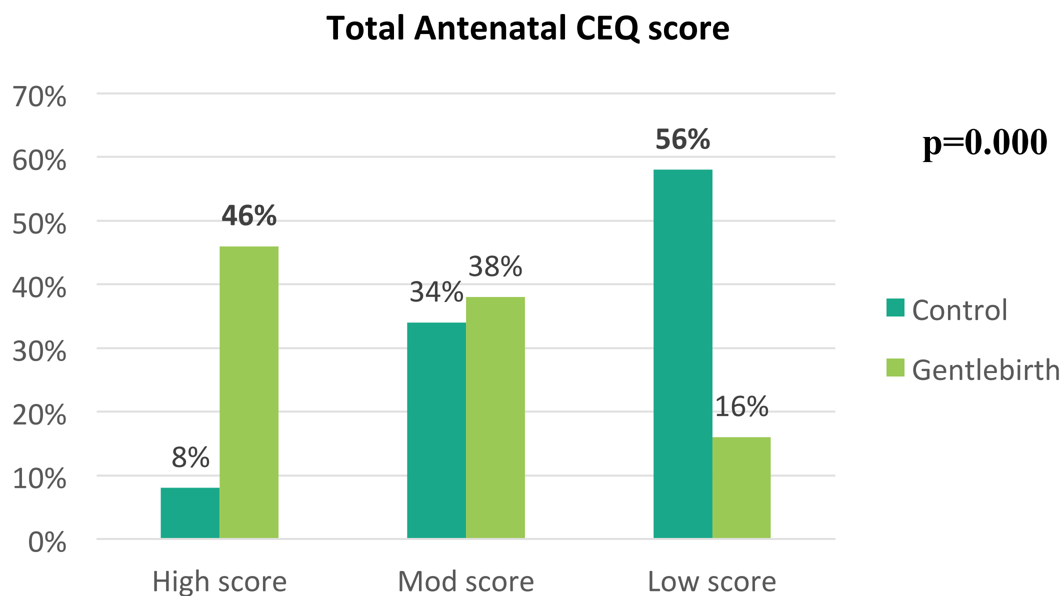
POSTNATAL	CONTROL GROUP	GENTLEBIRTH	p-value
Mean age (year)	33.8 (range 22-42)	33.6 (range 23-44)	n.s.
Mean parity	1.6 (range 1-4)	1.48 (range 1-4)	n.s.
Mean gestation at delivery (week)	40 (range 36+6 - 41+4)	40+2 (range 35-42)	n.s.
Marital status	74% married, 26% single in relationship	82% married, 18% single in relationship	n.s.
Induction	46.9% induced, 53.1% spontaneous labour	24% induced, 76% spontaneous labour	0.017
Intervention	38% instrumental delivery	24% instrumental delivery	n.s.
Perineal injury	62% perineal tear, 38% intact	70% perineal tear, 30% intact	n.s.
Epidural use	56% epidural use, 44% nil	26% epidural use, 74% nil	0.002
Intrapartum complications	10% complicated labour, 90% nil	16% complicated labour, 84% nil	n.s.
Mean birthweight (kg)	3.54 (range 2.48-4.68)	3.57 (range 1.8-4.71)	n.s.
Baby's gender	56% male, 44% female	46% male, 54% female	n.s.
Breastfed/bottlefed	68% breastfed, 32% bottledfed	96% breastfed, 4% bottlefed	0.000
NICU admission	2% admission	4% admission	n.s.

Childbirth Expectation Questionnaire (1991 Gupton et al.)

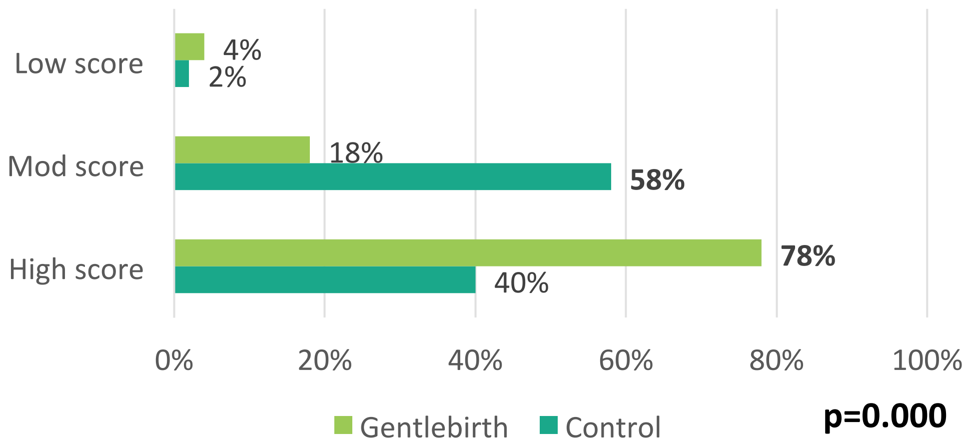
This instrument has a mean score of 97.6 (control group) and 139.8 (Gentlebirth). The scores were further stratified into the following:

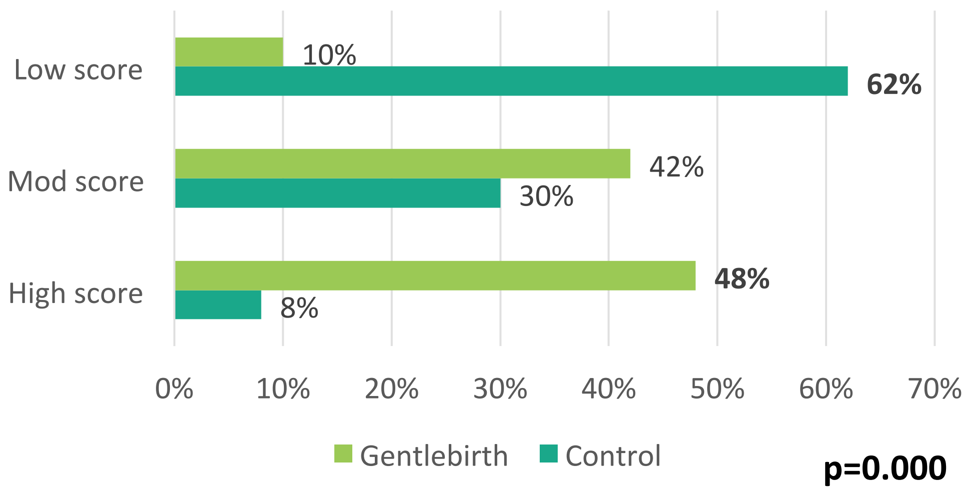
High score	128-175
Moderate score	82-127
Low score	35-81

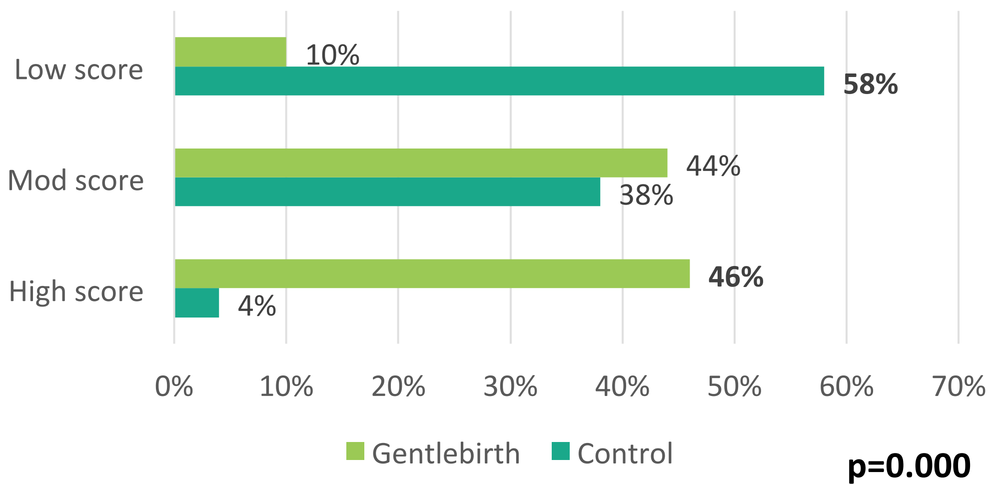
For total score, majority of Gentlebirth mums (46%) achieved high score, while most control group mums scored poorly (58%). ($p<0.01$) Higher score correlates with more positive birthing experience.



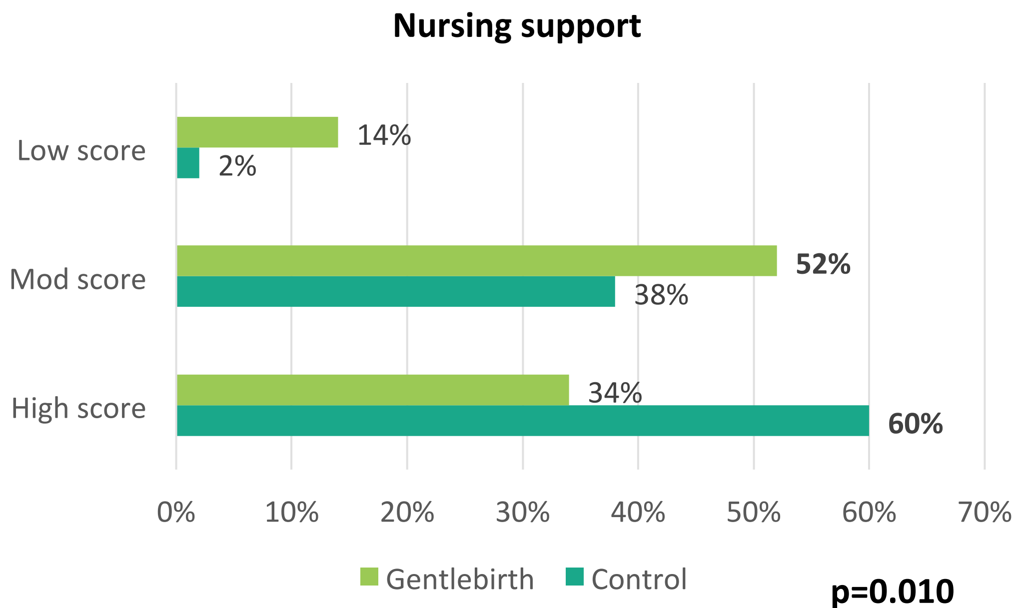
For the four domains in the questionnaire, majority Gentlebirth women achieved higher score in three domains; “significant other” (78%) ($p<0.01$), “coping with pain” (48%) ($p<0.01$) and “labour intervention” (46%) ($p<0.01$).


Significant other
Low score
Mod score
High score
4%
2%
18%
58%
78%
40%
0%
20%
40%
60%
80%
100%
Gentlebirth
Control
p=0.000


Pain/coping
Low score
Mod score
High score
10%
62%
42%
30%
48%
8%
0%
10%
20%
30%
40%
50%
60%
70%
Gentlebirth
Control
p=0.000


Labour intervention
Low score
Mod score
High score
10%
58%
44%
38%
46%
4%
0%
10%
20%
30%
40%
50%
60%
70%
Gentlebirth
Control
p=0.000

On the other hand, control group mums scored higher in the "nursing support" category (60%) (p=0.01)

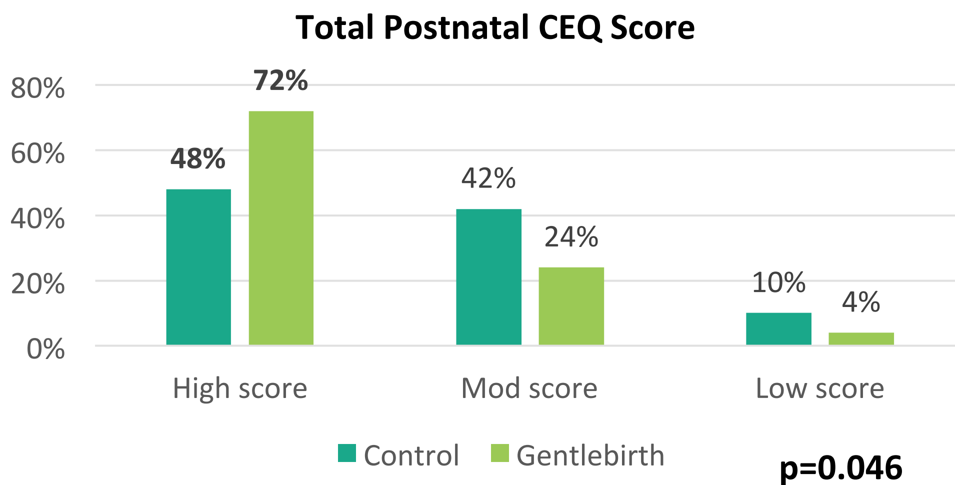


Childbirth Experience Questionnaire (2011 Dencker et al.)

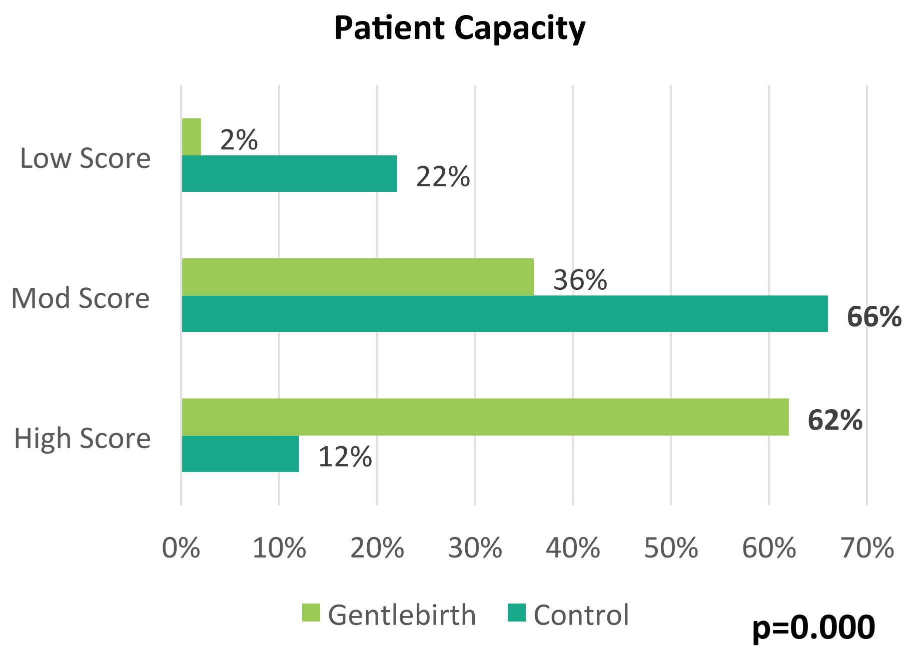
This questionnaire has a mean score of 71.1 (control group) and 77.0 (Gentlebirth). The scores were further stratified into the following:

High score	66-88
Moderate score	44-65
Low score	22-43

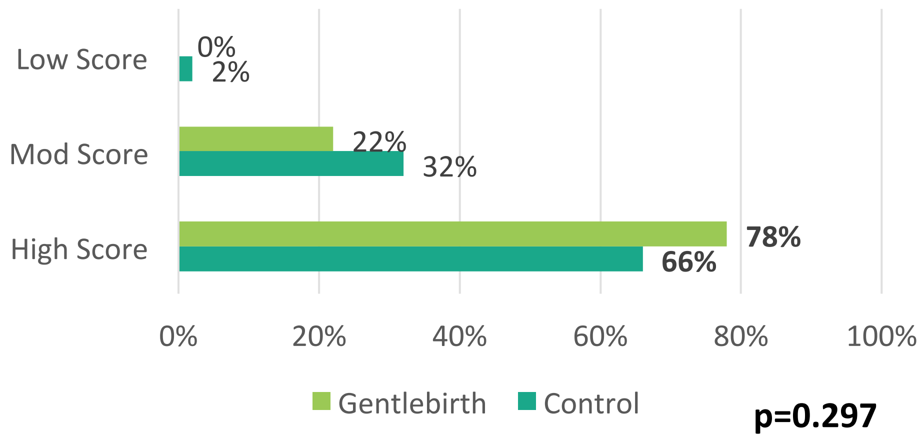
For total score, majority mums from both groups achieved high score. (72% Gentlebirth, 47% control group) ($p<0.05$) Higher score indicates more positive birthing experience.

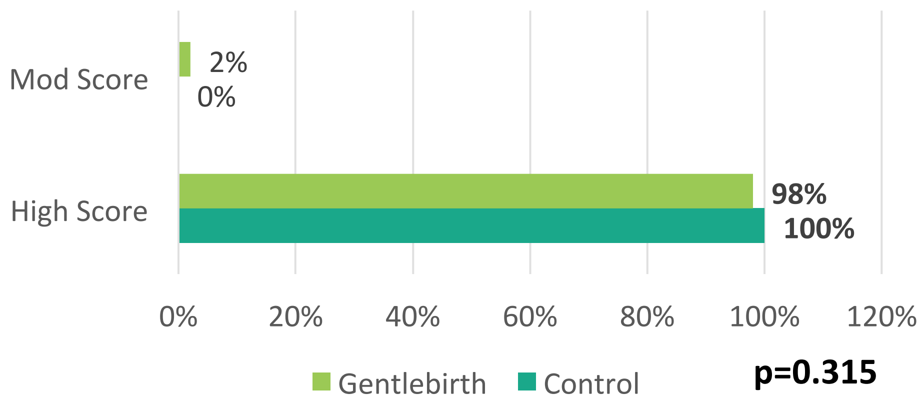


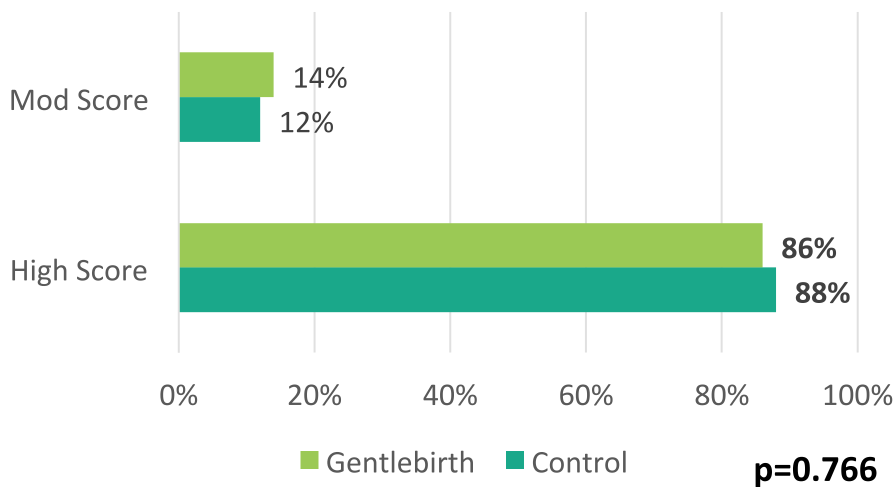
For the four domains, only one domain "coping ability" illustrated significant difference between both groups. Majority Gentlebirth participants scored higher (62%), whereas majority control group mums scored moderately (66%) ($p<0.01$)



The remaining domains showed no significant difference between both groups. ($p>0.05$)


Perceived safety
Low Score
Mod Score
High Score
0%
2%
22%
32%
78%
66%
0%
20%
40%
60%
80%
100%
Gentlebirth
Control
p=0.297


Professional support
Mod Score
High Score
2%
0%
98%
100%
0%
20%
40%
60%
80%
100%
120%
Gentlebirth
Control
p=0.315


Patient participation
Mod Score
High Score
14%
12%
86%
88%
0%
20%
40%
60%
80%
100%
Gentlebirth
Control
p=0.766

DISCUSSION

This research assessed the correlation between birth preparation modalities and the maternal's expectation and experiences of labour, and potential labour outcomes. Overall, Gentlebirth mums have more positive birthing expectation and experience. Positive birthing expectation is associated with anticipation to cope with pain ($p<0.01$), reduced need for medical intervention ($p<0.01$) and receiving support from partner/coach ($p<0.01$). On the other hand, positive experience is related to better coping ability ($p<0.01$).

The natural birth approach aims to ease muscle tension, which is induced by fear and inevitably leads to labour pain. This concept was emphasized in Gentlebirth. Training in relaxation and education of birth's physiological process is designed to lessen anxiety and stress, and consequently, mothers should experience less pain during delivery[49].

Gentlebirth replaces fear and anxiety with confidence and control. During the course, women learnt how to tune out distractions and tune in to their natural birthing instincts. Women can also practise training using Gentlebirth app at all times during pregnancy or even in labour, which really helps them to be in tune with their selves and keeping their mind in relaxation. The app consists of variable recordings that can be tailored to every woman's need. Self-hypnosis and relaxation are keys that can help to reduce the hormone adrenaline, which increases pain level, and promoting the release of oxytocin to help labour progress quickly and comfortably. A study by Lamaze et al.[50] introduced relaxation as a conditioned response to labour contractions, which includes several breathing techniques to interfere with the pain signal transmission from the uterus to the brain and improves oxygenation during labour.

Gentlebirth includes not only the expectant mothers but also encourages their partners to participate in the birthing journey. This is another important factor that aids mothers to be in relaxation, as their partners can give physical and emotional support to them. This is also beneficial for fathers who want to contribute to help their wife or partner, as well as being able to strengthen the bond between them and their unborn child.

In line with the recent launching of "National Maternity Strategy 2016-2026: creating a better future together" in Ireland, one of the four strategic priorities is "recognizing pregnancy and birth as a normal physiological process and facilitating a woman's choice regarding their preferred pathway of care." Comprehensive antenatal education is also outlined in the strategy as "to benefit women and their partners, as well as helping and preparing them for pregnancy, childbirth and parenthood." This is what we are aiming to achieve with our antenatal education. Therefore, consideration should be given to include and introduce some concepts from Gentlebirth into our current antenatal education programmes.

Nonetheless, the limitation of this research lies in the factor that it is a prospective cohort study, and not a longitudinal study. It would be more preferable to look into the outcome of a woman's expectation before labour and comparing it to her actual experience after delivery. Therefore a longitudinal study with longer time frame and bigger sample size would be recommended for future studies to test and evaluate these birthing outcomes.

Last but not least, higher proportion of breastfeeding, lesser induction and reduced epidural use during labour were seen in the Gentlebirth population. However, the reasons for these were still unclear in this research. It would prove to be beneficial if further study can be done to look into these findings.

CONCLUSION

Birth preparation is well-recognised as an important element for helping women to cope with labour. Gentlebirth seems to induce more positive maternal birthing expectation and experience in comparison to midwife-led standard antenatal class. Further longitudinal studies are required to explore these initial findings.

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REFERENCES

1. Fisher B, Esplin S, Stoddard G, Silver R. 125: Randomized controlled trial of hypnobirthing versus standard childbirth classes: patient satisfaction and attitudes towards labor. American Journal of Obstetrics and Gynecology. 2009;201(6, Supplement):S61-S2.

2. Lowe NK. The nature of labor pain. Am J Obstet Gynecol. 2002;186(5 Suppl Nature):S16-24.

3. Simkin P, Bolding A. Update on nonpharmacologic approaches to relieve labor pain and prevent suffering. J Midwifery Womens Health. 2004;49(6):489-504.

4. Gaskin IM. The pain/pleasure riddle. Ina May's Guide to Childbirth. New York: Bantam Dell, 2003:150–66.

5. Melzack R. The myth of painless childbirth (the John J. Bonica lecture). Pain. 1984;19(4):321-37.

6. Melzack R, Taenzer P, Feldman P, Kinch RA. Labour is still painful after prepared childbirth training. Canadian Medical Association journal. 1981;125(4):357-63.

7. Cyna A, Crowther C, Robinson J et al. Hypnosis antenatal training for childbirth: a randomised controlled trial. BJOG 2013; 120: 1248–1259

8. Lowe NK. The pain and discomfort of labour and birth. J Obstet Gynecol Neonatal Nurs 1996; 25: 82–92

9. Waldenstrom U. Experience of labor and birth in 1111 women. J Psychosom Res 1999; 47: 471–482

10. Waldenstrom U, Borg IM, Olsson B et al. The childbirth experience: a study of 295 new mothers. Birth 1996; 23: 144–153

11. Gottval K, Waldenstrom U. Does a traumatic birth experience have an impact on future reproduction? BJOG 2002; 109: 254–260

12. Creedy DK, Shochet IM, Horsfall J. Childbirth and the development of acute trauma symptoms: incidence and contributing factors. Birth 2000; 27: 104–111

13. Saisto T, Halmesmaki E. Fear of childbirth: a neglected dilemma. Acta Obstet Gynecol Scand 2003; 82: 201–208

14. Waldenstrom U, Hildingsson I, Ryding EL. Antenatal fear of childbirth and its association with subsequent caesarean section and experience of childbirth. BJOG 2006; 113: 638–646

15. Escott D, Slade P, Spiby H. Preparation for pain management during childbirth: The psychological aspects of coping strategy development in antenatal education. Clinical Psychology Review. 2009;29(7):617-22.

16. Jaddoe VWV. Antenatal education programmes: do they work? Lancet 2009; 374: 863–864

17. Dave T, Johnson D, Ingram J. Transition to parenthood: the needs of par- ents in pregnancy and early parentood. BMC Pregnancy Childbirth 2008; 8: 30

18. Fabian HM, Radestad IJ, Waldenstroem U. Childbirth and parenthood education classes in Sweden: women's opinion and possible outcomes. Acta Obstet Gynecol Scand 2005; 84: 436–443

19. Artieta-Pinedo I, Paz-Pascual C, Grandes G et al. The benefits of antenatal education for the childbirth process in Spain. Nurs Res 2010; 59: 194–202

20. Paz-Pascual C, Artieta Pinedo I, Grandes G et al. Design and process of the EMA cohort Study: the value of antenatal education in childbirth and breastfeeding. BMC Nurs 2008; 7: 5

21. Gagnon AJ, Sandall J. Individual or group antenatal education for child- birth or parenthood, or both. Cochrane Database Syst Rev 2007; 3: CD002869

22. O'Meara CM. Childbirth and parenting education – the providers' viewpoint. Midwifery 1993; 9: 76–84

23. Montgomery GH, David D, Winkel G, Silverstein JH, Bovbjerg DH: The effectiveness of adjunctive hypnosis with surgical patients: a meta-analysis. Anesth Analg 2002, 94(6):1639-45.

24. Montgomery GH, Weltz CR, Seltz M, Bovbjerg DH: Brief presurgery hypnosis reduces distress and pain in excisional breast biopsy patients. Int J Clin Exp Hypn 2002, 50(1):17-32.

25. Faymonville ME, Fissette J, Mambourg PH, Roediger L, Joris J, Lamy M: Hypnosis as adjunct therapy in conscious sedation for plastic surgery. Reg Anesth 1995, 20(2):145-51.

26. Werner WE, Schauble PG, Knudson MS. An argument for the revival of hypnosis in obstetrics. The American journal of clinical hypnosis. 1982;24(3):149-71.

27. Erickson JC, 3rd. The use of hypnosis in anesthesia: a master class commentary. The International journal of clinical and experimental hypnosis. 1994;42(1):8-12.

28. Cyna AM, McAuliffe GL, Andrew MI. Hypnosis for pain relief in labour and childbirth: a systematic review. Br J Anaesth. 2004;93(4):505-11.

29. Lucas-Polomeni MM. Hypnosis: a new anesthetic technique! Paediatric anaesthesia. 2004;14(12):975-6.

30. Faymonville ME, Roediger L, Del Fiore G, Delgueldre C, Phillips C, Lamy M, et al. Increased cerebral functional connectivity underlying the antinociceptive effects of hypnosis. Brain research Cognitive brain research. 2003;17(2):255-62.

31. Lang EV, Benotsch EG, Fick LJ, Lutgendorf S, Berbaum ML, Berbaum KS, et al. Adjunctive non-pharmacological analgesia for invasive medical procedures: a randomised trial. Lancet (London, England). 2000;355(9214):1486-90.

32. Greenleaf E. Defining hypnosis during hypnotherapy. The International journal of clinical and experimental hypnosis. 1974;22(2):120-30.

33. Gamsa A: Hypnotic Analgesia. In Handbook of Pain Management Edited by: Melzack R, Wall PD. Sydney: Curchill Livingstone; 2003:521-531.

34. Smith CA, Collins CT, Cyna AM, Crowther CA. Complementary and alternative therapies for pain management in labour. The Cochrane database of systematic reviews. 2003(2):Cd003521.

35. Cyna AM, McAuliffe GL, Andrew MI. Hypnosis for pain relief in labour and childbirth: a systematic review. Br J Anaesth. 2004;93(4):505-11.

36. Huntley AL, Coon JT, Ernst E. Complementary and alternative medicine for labor pain: a systematic review. Am J Obstet Gynecol. 2004;191(1):36-44.

37. Kabat-Zinn J. Coming to our sense. New York: Hyperion; 2005

38. Baer RA. Mindfulness training as a clinical intervention: A conceptual and empirical review. Clin Psychol Sci Prac. 2003;10:125–43.

39. Keng S, Smoski MJ, Robins CJ, Ekblad AE, Brantly JG. Mechanisms of change in mindfulness-based stress reductiona: self-compassion and mindfulness as mediators of interventions outcomes. J Cogn Psyhother. 2012;26(3):270–80.

40. Kabat-Zinn J. Coming to our sense. New York: Hyperion; 2005.

41. Segal ZV, Williams JMG, Teasdale JD. Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse. New York: Guilford Press; 2002.

42. Reiner K, Tibi L, Lipsitz J. Do mindfulness-based interventions reduce pain intensity? a critical review of the literature. Pain Med. 2013;14:230–42.

43. Khoury B, Lacomte T, Fortuin G, Masse M, Therien P, Bouchard V, Chapleau M, Paquin K, Hofman S. Mindfulness-based therapy: A comprehensive meta-analysis. Clin Psychol Rev. 2013;33:763–71.

44. Goodman JH, Guarino A, Chenausky K, Klein L, Prager J, Petersen R, Forget A, Freeman M. CALM Pregnancy: results of a pilot study of mindfulness- based cognitive therapy for perinatal anxiety. Arch Womens Ment Health. 2014;17(5):373–87.

45. Guardino CM, Dunkel Schetter C, Bower JE, Lu M, Smalley SL. Randomised controlled pilot trial of mindfulness training for stress reduction during pregnancy. Psychol Health. 2014;29(3):334–49.

46. Duncan LG, Cohn M, Chao M, Cook J, Riccobono J, Bardacke N. Mind in labor: effects of mind/body training on childbirth appraisals and pain medication use during labor. J Altern Complement Med. 2014;20(5):A17.

47. A. Gupton, J. Beaton, J. Sloan, I. Bramadat The development of a scale to measure childbirth expectations Can J Nurs Res, 23 (2) (1991), pp. 35–47

48. Dencker A, Taft C, Bergqvist L, Lilja H, Berg M. Childbirth experience questionnaire (CEQ): development and evaluation of a multidimensional instrument. BMC Pregnancy Childb. 2010;10:81. doi: 10.1186/1471-2393-10-81.

49. Jaddoe VWV. Antenatal education programmes: do they work? Lancet 2009; 374: 863–864

50. Lamaze F. Painless Childbirth: psychoprophylactic Method. London: Burke; 1958