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EFFECT OF KINESIO TAPING AND ANTENATAL EXERCISE VS. ANTENATAL EXERCISE ON PAIN INTENSITY AND DISABILITY IN MOTHERS WITH PREGNANCY- RELATED LOW BACK PAIN: A COMPARATIVE STUDY

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ABSTRACT:

Objective To evaluate the effects of Kinesio- taping and Antenatal exercises on pain intensity and disability in mothers with pregnancy induced low back pain.

Patients and methods: 30 mothers who met the inclusion and exclusion criteria were recruited from SGT Hospital, Gurugram. Their age ranged between 18- 35 years with mean value (24.99 ± 4.08). Gestation age ranged from 13th week to 37th week with mean value (30.7 ±4.96). All mothers were randomly allocated into 2 groups i.e., Group A (study group) 30 mothers and Group B (control group) 30 mothers. All mothers in both groups received antenatal exercises and ergonomic advices however group A received kinesio taping techniques prescribed for low back pain during pregnancy for four weeks, in two applications each of them continued for three days with one day as rest in between them, in additional to antenatal exercises and ergonomic advices as group B. All the mothers in each group were evaluated for pain and disability with the help of numeric pain rating scale (NPRS) and pain and functional disability scores (RMDQ)

Results -The results of both groups (A and B), NPRS and RMDQ scores showed a highly significant ($p< 0.05$) improvement in both the groups but group A showed much better results statistically than group B results in terms of all the variables. However, there was a highly significant decreased pain and functional disability scores ($p< 0.05$) in group A compared to group B at the end 4th week.

Conclusion: It can be concluded that kinesio taping augmented with antenatal exercises is an effective method in treatment of low back pain (LBP) and disability during pregnancy.

Keywords – Low back pain, kinesio taping, antenatal exercises

INTRODUCTION

Pregnancy induced low back pain is a very common complaint of pregnant women mostly after the end of 1st trimester. This is generally characterized as discomfort in the lower lumbar region which is musculoskeletal in nature. This can be due to mechanical, hormonal, circulatory, and psychosocial factors change which take place during pregnancy. Discomfort during this region can also be results in change within the posterior pelvic region, mainly the sacroiliac joints which undergo changes during pregnancy.

Morgen et al. reported a mean gestation age at which the pain starts is of 22.1 weeks. However, in a study, up to 20% of women claimed that pain started as early as 16 weeks while some claimed pain within the first month (Sabina et al., 2008). Sometimes pain can become so severe that it hinders with activities of daily life, disturbs sleep and contributes to high levels of sick leave (Kalus 2007; Mogren 2006; Sinclair 2014; Skaggs 2007).

LBP during pregnancy is very similar to that of pain in lower back experienced by women who are not pregnant and the pain appears over and around the lumbar spine, above the sacrum, making the differentiation between pelvic girdle pain (PGP) and LBP much easier. LBP may or may not radiate to the foot, unlike in PGP. Tenderness over paravertebral muscles is a common finding (Ostgaard et al., 1994). Other symptoms include stiffness and restricted motion in the back or legs. Pain and associated symptoms may be constant or may only aggravate in certain positions or after extended activity.

Approximately one-third of patients report that pain increases as the day goes on while another one-third report that the pain worsens during the night and often disturbs sleep (Fast A et al., 1987).

Interventions that have been used till date to help manage the low back pain includes exercises, rest, hot and cold compresses, abdominal or pelvic support belts, massage, acupuncture, chiropractic, aromatherapy, relaxation, herbs, yoga, Reiki, acetaminophen, TENS, hydrotherapy paracetamol, and NSAID'S (Sinclair 2014; Vermani 2010). Pregnant women seek out pain relief methods which include pain medication, exercise program, education, support binders, and chiropractic treatments, however, there is limited or no evidence related to their efficacy (Liddle et al., 2015). In an order to relieve pain from musculoskeletal injuries, an arising form of treatment among manual therapists, such as chiropractors, is the use of kinesiology tape.

Taping has been suggested as a treatment because it has a number of proposed benefits. These benefits include: supporting the affected area, relaxing the muscles and reducing pain sensation. It is designed to replicate the physical properties and characteristics of human skin and it has been suggested that it helps in the normalizing of muscular function, increase lymphatic flow and vascular flow, reduce pain through neurological suppression, and possibly contribute to corrections of joint misalignments. Although the full action of tape has yet to be clarify, the effectiveness reported in various other clinical conditions has shown both positive and negative results in the non-pregnant population. (Kase, K et al. 2003).

SUBJECTS MATERIALS AND METHODS

Subjects

30 mothers who met the inclusion and exclusion criteria were recruited from SGT Hospital, Gurugram. Their age ranged between 18- 35 years with mean value (24.99 ± 4.08). Gestation age ranged from 13th week to 37th week with mean value (30.7 ±4.96). All subjects were referred by obstetricians after complete medical examination. All subjects filled a consent form before starting the study.

Inclusion Criteria

Subjects whose maternal age over 18 years till 35 years; With singleton pregnancy; Gestation age between 13th week to 37th weeks diagnosed by gynecologist for low back pain; Volunteering to participate in the study; Not using analgesics for low back pain; Not using other methods for the treatment low back pain; Negative posterior pelvic pain provocation test (P4) (Katonis P et al., 2011), Positive lumbar pain provocation test. (Nore´n L et al., 1999)

Exclusion Criteria

Subjects with history of previous surgeries in the back, serious back injury at time of study (disc prolapse, spondylolisthesis), Concurrent injuries of cervical and\or thoracic spine and those who attended antenatal classes, were excluded from the study.

Subjects were randomly assigned into two Group

Group A (Study group): thirty primigravida with low back pain during pregnancy received Kinesio taping along with Antenatal exercises and ergonomic advice during pregnancy. Patients were assessed before participation in the study and after four weeks.

Group B (control Group): thirty primigravida with low back pain during pregnancy received Antenatal exercises and Ergonomic care during pregnancy. Patients were evaluated before participation in the study and after four weeks.

Materials

1. NPRS: The NPRS was designed to measure a ―subject's perceived pain level on an 11-point scale (0 indicating ―no pain‖ and 10 the ―worst pain imaginable‖

2. Roland-Morris Disability Questionnaire - The Roland-Morris Disability Questionnaire is a self-administered disability measure in which greater levels of disability are reflected by higher numbers on a 24- point scale.

3. Cotton and sanitizer are used to clean skin prior to Kinesio Tape application, as skin should be free of oils and lotions. Anything that limits the acrylic adhesive's ability to adhere to the skin will limit both effectiveness and length of application.

4. Kinesio Tape is an elastic adhesive tape that is used for the kinesio taping method. (Kinesio Tex® Gold (GKT15024), Albuquerque, USA) Kinesio Tape has been designed to allow for a longitudinal stretch of 55-60 % of its resting length. This degree of stretch approximates the elastic qualities of the human skin. The tape is not designed to stretch horizontally. The Kinesio Tape is applied to the paper substrate with approximately 25% of available tension. The average roll of Kinesio Tex® Gold Tape size is 5 cm×5m (2in×16.4ft) and it can stretch 35% from its resting length

Methods

1. Kinesio Taping

Position of the mother - either in standing or sitting and leaning forward in maximum flexion of the spine. Sanitizer or astergent was used to clean skin prior to tape application as skin should be free of oils and lotions (Kase et al., 2003). Tape application consisted of three strips, creating an H-pattern first two ―I shaped i.e., Bilateral Kinesio "I" strip was used for the Para spinal muscles. The tape is measured from the sacrum to the 12th thoracic vertebra with forward flexion of the trunk of the mother. The base was affixed to the insertion in the resting position i.e., from the caudal side below the pain area, and then the tape is then affixed with 10% stretch paravertebrally over the muscle bundles up to T12. Identical application was made on the other side of the spine (Figure 3.11.1). Then, a transverse application with tension correction (75%) of the pain area was done (Figure 3.11.2). (Kalinowski et al., 2007) The tape is rubbed with the muscle in the elongated state. (Kumbrink (2009) K-Taping: An Illustrated Guide - Basics – Techniques)

2. Antenatal exercises

The Antenatal group practiced the standard Antenatal practices which included simple stretching exercises approved by the Executive Council of the society of Obstetrician and Gynecologists of Canada, and by the board of directors of the Canadian society for exercise physiology and ACOG (American college of Obstetrician and Gynecologist). Exercise protocol included 10 min of loosening/ stretching exercises followed by 25 min of Antenatal exercise and 5 min of cool down. These exercises ware given along with KT tape in group A while group B received these exercises without KT tape.

3. Ergonomic Care

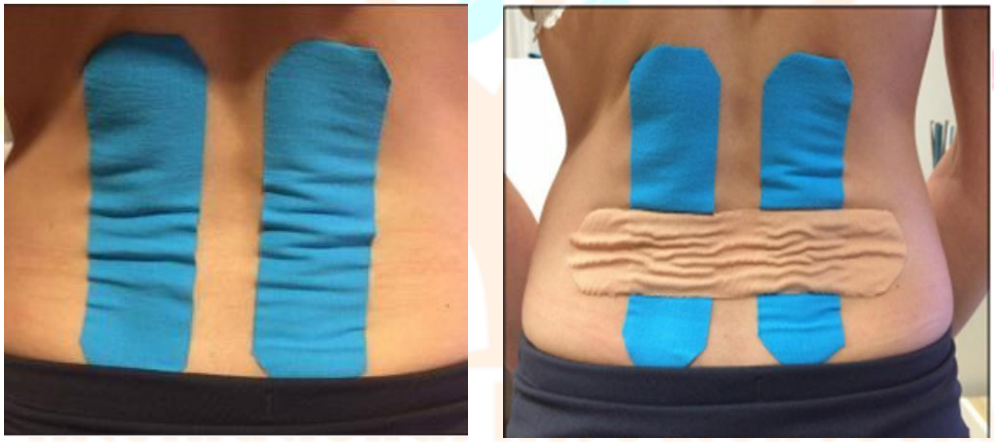
Ergonomic care was explained to the mothers of both the groups on the first day of the first week

• Sitting. The pregnant women was instructed to sit on chair that supports back and thighs. Place equal weight on each of her buttocks with her thighs fully supported and buttocks touching the back of the chair. Hip with the level of knee or slightly raised and her feet fully supported and flat on the supporting surface.

• Lying. Women were asked not to lie in supine position for much time. Women were advised that additional support may be necessary in the form of pillows, or extra mattress support. Comfort in supine lying can be increased with pillows under the thighs and with three or four pillows or a wedge raising the head and shoulders sufficiently to avoid supine hypotension. Side lying with pillows under the top forearm and knee was usually advised as a comfortable position in pregnancy but was not advised if the woman is suffering from any pelvic discomfort. Instead, side lying with the top leg supported by the underneath leg but separated by a pillow is recommended to be more comfortable.

• Standing. Women were advised to avoid standing for long periods and avoid high heels in favor of a medium or low heel shoe for equal distribution of weight while standing. Shoulders that are relaxed and down help to prevent thoracic aches.

• Household Activities: All mothers will be advised that many tasks such as ironing or preparing food can be undertaken in a sitting position instead of standing.

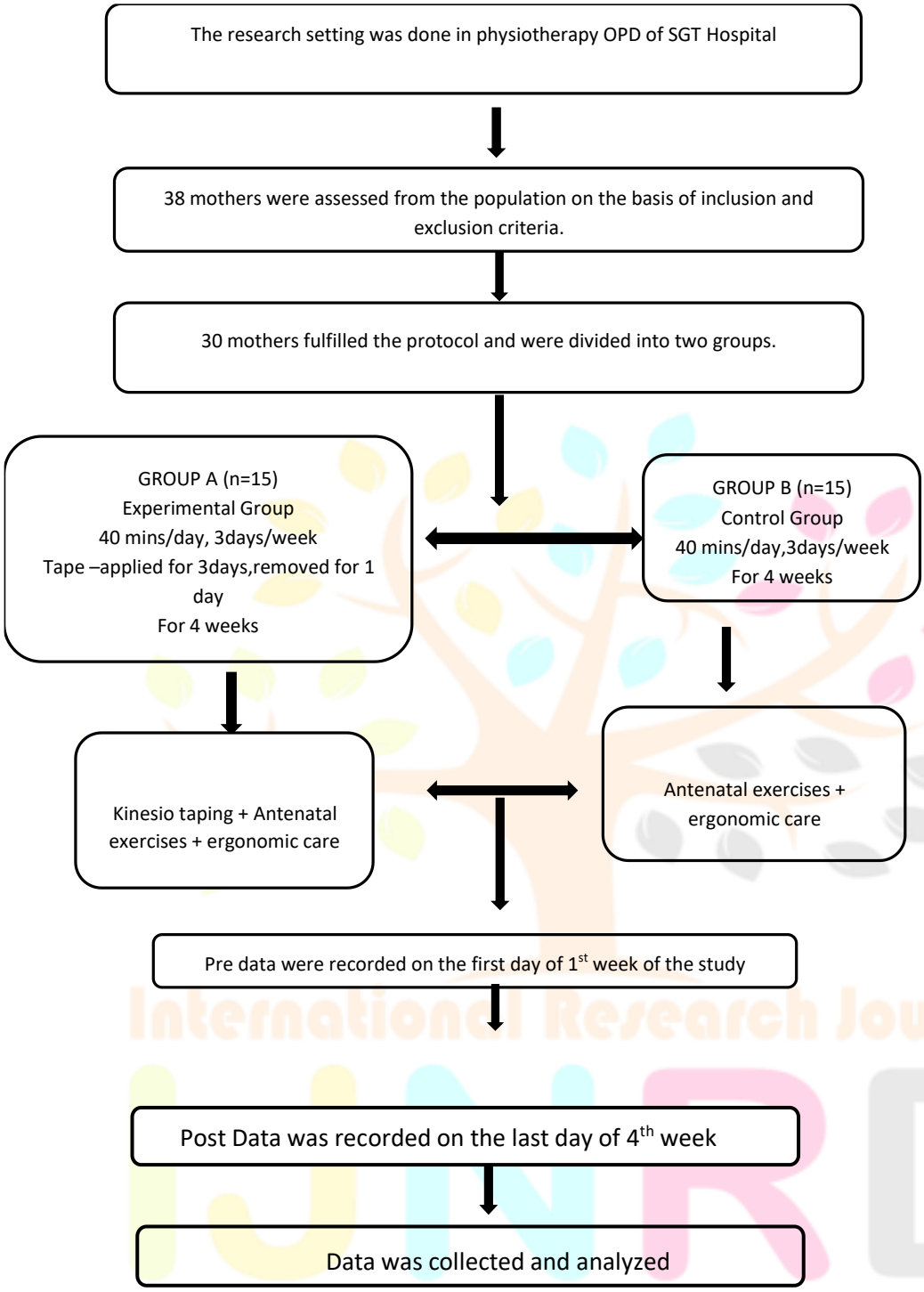


(a) (b)

Figure 3.11.2 (a) Identical applications of I tape on either side of the spine

(b) Transverse application over the pain area

PROTOCOL


The research setting was done in physiotherapy OPD of SGT Hospital
38 mothers were assessed from the population on the basis of inclusion and exclusion criteria.
30 mothers fulfilled the protocol and were divided into two groups.
GROUP A (n=15)
Experimental Group
40 mins/day, 3days/week
Tape –applied for 3days,removed for 1 day
For 4 weeks
GROUP B (n=15)
Control Group
40 mins/day,3days/week
For 4 weeks
Kinesio taping + Antenatal exercises + ergonomic care
Antenatal exercises + ergonomic care
Pre data were recorded on the first day of 1st week of the study
Post Data was recorded on the last day of 4th week
Data was collected and analyzed

RESULTS

Pain assessment scores

The mean value ± standard deviation of NPRS score for mothers in group A was 5.87 ± 1.24 before treatment and 1.87 ± 0.64 after four weeks of treatment. The mean value ± standard deviation of NPRS score for mothers in group B was 5.93 ± 1.22 before treatment 2.80 ± 0.67 after four weeks of treatment (Refer table 1 and graph1). Between group analysis of NPRS score showed significant difference in the NPRS score before treatment and after 4 weeks exercise program. (Table 1) (Graph 1)

Disability Assessment scores

The mean value ± standard deviation of RMDQ score for mothers in group A was 9.93 ± 1.27 before treatment and 2.40 ± 082 after four weeks of treatment. The mean value ± standard deviation of RMDQ score for mothers in group B was 11.00 ± 1.92 before treatment and 2.93 ± 0.79 after four weeks of treatment (Refer table 5.9 and graph 5.9). Between group analysis of RMDQ score showed that there was significant difference in the RMDQ score before treatment and after 4 weeks exercise program. (table2) (Graph2).

Table 1 comparison of NPRS scores between Group A and Group B

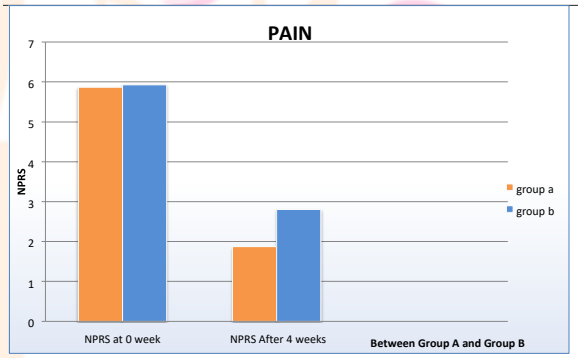
	Group	Mean ± SD	Z – value	p -value
NPRS (0 WEEK)	A	5.87 ± 1.24	-0.021	0.983^{Ns}
	B	5.93 ± 1.22		
NPRS (4 WEEK)	A	1.87± 0.64	-3.221	0.001^{s}
	B	2.80 ± 0.67		

Ns Non-Significant (p > 0.05) **p< 0.005(Highly significant) SD= Standard deviation

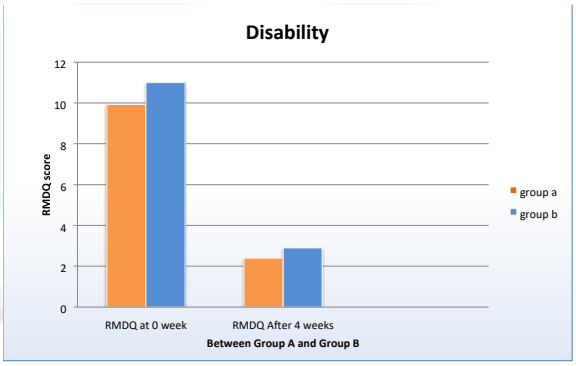
Table 2 Comparison of change in RMDQ scores between the Group A and Group B

	Group	Mean ± SD	Z – value	p-value
RMDQ (0 week)	A	9.93 ± 1.27	-1.410	0.159
	B	11.00 ± 1.92		
RMDQ (4 week)	A	2.40 ± 082	-2.887	0.004*
	B	3.60 ± 1.12		

Ns Non-Significant (p > 0.05) **p< 0.005(Highly significant) SD= Standard deviation



Graph 1comparison of NPRS scores between Group A and Group B



Graph 2 Comparison of change in RMDQ scores between the Group A and Group B

DISCUSSION

As a result of application of Kinesio taping and Antenatal exercise, pain and disability improved in both the groups but group A showed much better results statistically than group B.

Sabour et al. 2011 conducted a study of 30 primiparous women in the third trimester of gestation. They were divided into 2 groups: in the first one there were pregnant women who exercised to reduce spine pain, and in the second group they performed same physical exercises along with Kinesio taping application. The VAS scale was used to assess the pain intensity, the Oswestry questionnaire was used to assess the disability, and a flexible ruler was used for measuring the change in angle of lordosis in the sagittal plane. All measurements were assessed before and after the interventions given. The results of the study, as well as our own research, have clearly confirmed that Kinesio taping is an effective method to reduce lower back pain and may provide a safe complement to other therapies. Also, Kaplan et al., 2015 conducted a study which included sixty-five subjects in the study. The Kinesio taping method was additionally applied in the intervention group. As in the present study, the RMDQ and the VAS scale were used to assess the results. They showed that Kinesio taping along with paracetamol treatment is more effective treatment than pharmacological treatment alone. As in our own study, it has also been demonstrated that the RMDQ score has been decreased in both groups but it has been significantly decreased in group A indicating Kinesio taping method is more effective and can therefore be used as a complementary therapy for low back pain in pregnant women.

Intensity of the pain at rest and pain associated with physical activity were found to be significantly improved over the study period in patients receiving the Kinesio taping than the patient receiving Antenatal exercise alone. According to Kase K et al., 2003 the reasons for improvement in the outcome measures may include physiological mechanisms in which KT is assumed to have a therapeutic benefit i.e. 1) assemble fascia to align the tissue in a desired position, 2) lift the skin over areas of inflammation, pain, and edema, 3) increase stimulation of the mechano-receptors to either stimulate or inhibit the movement, 4) provide a positional stimulus to the muscle, and 5) decrease pressure over the lymphatic channels which provide a path for the removal of exudates . These physiological mechanisms remain theoretical because there very limited research done to support these physiological concepts. Two theories may support in understanding this finding. One theory is that KT increases the blood circulation in the area where tape is applied, and this physiological change may affect the muscle functions along with functions of myofascia after the application of Kinesio tape. An additional theory is that KT activates cutaneous mechanoreceptors at the taped area, and this stimulation may affect the ROM (Halseth et al., 2004; Hsu et al., 2009; Kase K et al., 2005).

Limitations of study

1. Sample size was small.

2. Follow up of the mothers was not done after 4 weeks to see any recurrence of symptoms.

3. Study duration was short.

CONCLUSION

Low back pain in pregnant women, as evaluated by NPRS and RMDQ after Kinesio taping, significantly improved when compared to Antenatal exercise alone. Individualized treatment in the form of subjects' education, exercises, pelvic belts, analgesics, and acupuncture can be of benefit. Further research is needed into the use of different forms of treatment such as acupuncture, TENS, and epidural analgesia, either in isolation or as complementary interventions for the safe and effective management of these conditions.

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