A Multicentral Quasi experimental Study on Impact of Neuromuscular Taping over Neck Pain

Yu Chye Wah[1], Kshtrashal Singh[2], Mahesh Hegde[3], Komala Bakrishnan[4], Mallisah Kaur[5,] Kamaraj B[6], Rahul Krishnan Kutty[7]

[1]Assoc. Professor, [2]Lecturer,[3]Lecturer, [4]Clinical Instructor, [5]Lecturer, School of Physiotherapy, Faculty of Allied Health Professions, AIMST University, Malaysia, [6]Principal, AKG Cooperative Institute of Health Sciences, Kerala, India, [7]Lecturer, MAHSA University, Malaysia

Abstract

Introduction: Neck pain in particular is considered to one of the major health problem in modern societies. It is also increasing in intensity, frequency, and severity because of more stress and strain on neck region. Neck pain is assumed to be multi factorial in origin, implying that several risk factors can contribute to its development. **Objective:** This study conducted to check the effectiveness of Neuromuscular Taping over Neck Pain in collaboration with Aimst University (Malaysia), University of Indonesia (Indonesia), NMT Institute Italy & USA, Mekelle University Ethiopia (East Africa) & Insitute of Paramedical Sciences, Kannur, India,. **Methodology:** A qualitative research model in the form of a prospective type quasi experimental study design was carried out in this study. The study was conducted in collaboration with AIMST University Malaysia, University of Indonesia, NMT Institute Italy & USA, Insitute of Paramedical Sciences, Kannur, India, and Mekelle University Ethiopia. In this study all Academic and non-academic professionals those who diagnosed with neck pain for at least for 6 month duration, were included as the Population of this study. Conveniently 800 participants were selected in collaboration with AIMST University Malaysia, University of Indonesia, NMT Institute Italy & USA, Mekelle University Ethiopia & Insitute of Paramedical Sciences, Kannur, India. **Result:** All Selected Participants with neck pain symptoms were assessed for Neck pain with neck pain index (NPI) respectively before and after intervention with neuromuscular taping. The results from most of the participants showed significantly improvement after intervention. **Conclusion:** As the pain factor is reducing, considering the fact NMT can be included as one among the modalities used for the treatment of neck Pain. Introduction of new intervention such as neuromuscular taping in terms of neck pain management itself is a very challenging. The investigation of such studies and their result will help for further research prospective.

Key Words: *Multicentral, Quasi experimental, Neuromuscular, Taping, Neck Pain.*

Introduction

Musculoskeletal disorders became increasingly common worldwide during the past few decades. It is common cause of work-related disability, among workers with substantial financial consequences due to workers compensation (Ariens, et, al, 2011)[1]**.** Neck pain in particular is considered to one of the major health problem in modern societies. It is also increasing in intensity, frequency, and severity because of more stress and strain on neck region**.** Neck pain is assumed to be multi factorial in origin, implying that several risk factors can contribute to its development[2]. Chronic neck pain patient uses the health care system twice as often as the rest of the population (Bongers, et, al, 2016)**.**Over a decade ago, the national Institute for Occupational Safety and Health, estimated that the cost associated with work related Musculoskeletal Disorder was $13 billion annually; more recently, this was projected to be between $45-54 billion[3]. With children being exposed to computer – related activities at even earlier ages, the health of the future work force deserves

Corresponding Author:
Kshtrashal Singh
kshtrashal@aimst.edu.my

contemplation (Bovimet, al, 2014)[4].The prospective studies on prevalence of neck pain are important to study the size and extent of this problem that would facilitate accurate prediction of the need for preventive measures[5]. It has also been suggested that cognitive or emotional processes play a strong role in the genesis. Neck -related disability, such as depression and anxiety or pain catastrophizing which may intervene in the relationship between structural pathology and disability (Chiu, et, al, 2012) [6]. Since higher educated population generally performs more reading tasks, higher education level may be one of the risk factors for neck. The past two decades showed rapid developments in technology which resulted in the increased use and requirement of computers at the workplace (Fejer, et, al, 2014)[7]. Varying requirements and demands at each profession require these skilled staff to use computers more in order to be able to perform their tasks efficiently (Fine, 2009)[7]. immobilization and static work lead to reduced blood circulation, which prevents the proper supply of nutrients to the muscles, and an accumulation of waste products, causing fatigue and pain and that on a daily basis, persistence of these conditions could be resulting chronic musculoskeletal disorders work related neck pain amongst university administrative staff [8]. Neck pain is one of the most common musculoskeletal complaints that affect about half of the adult population during a 1-year period (Grant,et,al., 2014)[9].It is considered as a major public health problem, both in terms of health and overall well-being of the person and the society. It has imposed relatively high direct and indirect costs, and may affect the quality of life and working condition of patients (Guez, et, al, 2012)[10]. They also correct the alignment of joints, support muscles during movement, and improve stability and posture. The NMT concept has five major functions: Removes congestion of body fluids activates endogenous analgesic systems, corrects joint problems, muscle support, and scar treatments [11]. Neuromuscular Taping often provides a solution in difficult situations, in acute stages, and in functional rehabilitation to reduce pain and inflammation. Results can be seen in a wider range of motion, with less pain and discomfort, facilitating the rehabilitation of patients [12.] Over the last 5 years in Europe proprioceptive NMT technique has become a mainstream treatment protocol in post-operative, oncology, neurological care of patients and in sports medicine. It is commonly used in the sports traumatology as well as patients with Multiple Sclerosis [13]. These study specific application processes of a NMT in specific therapeutic areas it has already been shown a certain improvement in mobility and lymphatic drainage[14]. The study was focused on neck pain magament, quantifying the efficacy of Neuromuscular Taping as a treatment method [15]. Lack of knowledge about NMT directly affects access.

Objectives of the Study

This study conducted to check the effectiveness of Neuromuscular Taping over Neck Pain in collaboration with Aimst University (Malaysia), University of Indonesia (Indonesia), NMT Institute Italy & USA, Mekelle University Ethiopia (East Africa) & Insitute of Paramedical Sciences, Kannur, India,.

Methods and Subjects

A qualitative research model in the form of a prospective type quasi experimental study design was carried out in this study. The study was conducted in collaboration with AIMST University Malaysia, University of Indonesia, NMT Institute Italy & USA, Insitute of Paramedical Sciences, Kannur, India, and Mekelle University Ethiopia. In this study all Academic and non-academic professionals those who diagnosed with neck pain for at least for 6 month duration, were included as the population of this study. Conveniently 800 participants were selected in collaboration with AIMST University Malaysia, University of Indonesia, NMT Institute Italy & USA, Mekelle University Ethiopia & Insitute of Paramedical Sciences, Kannur, India.

Treatment Procedures

Features: Width Cm 5 and Length 30 cm.

Reference points: Cervical-vertebra C1 –C7

Standard Application procedure (Cervical): Patient standing with hands resting on a table, anterior cervical flexion of 45 °. Apply the base of the tape on the C1 and laterally 2 cm from the vertebral column. Remove the paper leaving only a small piece to hold the strip. Ask the patient to round the cervical section (the skin over the cervical area must be stretched). The tape is applied with absolutely no tension. The tape is applied parallel to the column and must end at exactly the same level. The treatment was given twice per week for 6 weeks (8-10 sittings). The cure tape is approved by the FDA and the product name is Tape and bandage, adhesive. The route of administration is over the skin to achieve biomechanical therapy method using

decompressive and compressive stimuli to obtain positive effects in the musculoskeletal, vascular, lymphatic and neurological systems. Before the primary neuromuscular taping application VAS (visual analogue scale for pain scaling) were collected and this procedure was continuing till the end treatment sessions.

Work Plan & Contributions

No	Activities	Responsible Persons
1	Proposal development & draft submission	1Assoc.Prof.Dr.yu Chye Wah /2Kshtrashal Singh(AIMST University,Malaysia)
2	Ethical clearance	1Ms. Kavitha Shetty(AIMST University,Malaysia)
3	Select & training of data collectors	1Kshtrashal Singh (AIMST University,Malaysia)
4	Data collection	1Susmitha Govind/2Kasmalina 3Mr.Mahesh Hegde/4Ms.komala/5Ms.Shankari/6Ms. Malisha/7Mr. Nazri/8Mr.Goh/9Aditya Denny Pratama / 10Rahul Krishnan Kutty (MAHASA University , Malaysia)/ 11Saurabh Singh/ 12Khushboo Gupta/ 13Sivakumar Pendyala/ 14Kameswari Kondreddy/ 15Saurabh Shekhar.(1-8 & 11-15 AIMST University ,Malaysia)
5	Pilot Report	1Kshtrashal Singh(AIMST University,Malaysia) / 2Dr. Alemayehu Berhe(Mekelle University, Ethiopia) /3David Blow(NMT Italy & USA)/ 4Aditya Denny Pratama(University of Indonesia) / 5Rahul Krishnan Kutty(MAHASA University, Malaysia)
6	Data entry & analysis	Assoc.Prof.Dr.yu Chye Wah(AIMST University,Malaysia)
7	First draft	Kshtrashal Singh/(AIMST University,Malaysia) Assoc.Prof.Dr.yu Chye Wah(AIMST University,Malaysia)/ Dr. Alemayehu Berhe(Mekelle University, Ethiopia)/ David Blow(NMT Italy & USA)/ Aditya Denny Pratama(University of Malaysia) / Rahul Krishnan Kutty(MAHASA University Malaysia)/Heera S(Institute of Paramedical Sciences, Kerala, India)/Kamaraj B(AKG Institute, Kerala India)
8	Second draft	Kshtrashal Singh(AIMST University,Malaysia)/ Assoc.Prof.Dr.yu Chye Wah(AIMST University,Malaysia)/ Dr. Alemayehu Berhe (Mekelle University, Ethiopia)
9	Final report	Kshtrashal Singh(AIMST University,Malaysia)/ Assoc.Prof.Dr.yu Chye Wah(AIMST University,Malaysia)/ Dr. Alemayehu Berhe(Mekelle University, Malaysia)/ David Blow(NMT Italy & USA)/ Aditya Denny Pratama(University of Indonesia) / Rahul Krishnan Kutty(MAHASA University Malaysia)/Heera S(Institute of Paramedical Sciences, Kerala, India)//Kamaraj B. (AKG Institute, Kerala, India)

Results

A total of 800 subjects were selected in collaboration with Insitute of Paramedical Sciences, Kannur, India, Mekelle University, Ethiopia, NMT Institute Italy & USA, University of Indonesia and AIMST University Malaysia.

Table 1: Distribution of study samples by location

Centre/Country	Frequency	Percentage
India	200	25%
Ethiopia	200	25%
Indonesia	200	25%
Malaysia	200	25%

All selected participants with neck pain symptoms from respective centre were assessed for neck pain with neck pain index (NPI) respectively before and after intervention with neuromuscular taping. The results from most of the centres showed significantly improvement after intervention (Table 2). In India, there was a significant difference in neck pain reduction before and after intervention ($t(199)=34.290$, $p<0.001$).In Ethiopia, there was a significant difference in reduction of neck pain ($t(199)=33.604$, $p<0.001$).Similarly, a significantly reduction in neck pain ($t(199)=37.810$, $p<0.01$)were found in Indonesia. For Malaysia, there was a significant difference in reduction of neck pain ($t(199)=9.539$, $p<0.001$).Between pre and post intervention with neuromuscular taping (Table 2).

Table 2: Neck pain intensity index during pre and post intervention by centre/country

Centre	NPI-Pre It (mean±SD)	NPI-Post It (mean±SD)	t (df)	pa
India	3.69±1.32	2.16±1.360	34.290(199)	0.000
Ethiopia	4.00±1.22	2.62±1.278	33.604 (199)	0.000
Indonesia	3.69±1.32	1.81±1.14	37.810(199)	0.000
Malaysia	2.11±1.45	1.73±1.04	9.539 (199)	0.000

Note: NPI: Neck pain index; It: Intervention; SD: Standard deviation, DF: Degree of freedom; Paired t-test

The results from comparison of overall neck pain intensity index between pre and post intervention among all participants showed significant effect ($Z=-22.520$, $p<0.001$) (Table 3).

Table 3: Effect of overall neck pain after intervention

	Mean	SEM	Z	p[a]
Overall neck pain index Pre-intervention Post-intervention	 3.2261 2.0555	 0.5299 0.4095	-22.520	0.000

Note: SEM: Standard error of mean, a: Wilcoxon signed rank test

The results comparing the mean difference in reduction of neck pain revealed significant difference among the centres ($\chi 2$ (3) =508.742, $p<0.001$).

Table 4: Comparison of improvement between neck pain index and low back pain index among university groups

Outcome Difference	Centre-Country	Mean	SE	95% CI		χ^2	p[a]
				Lower	Upper		
Neck pain index	ku-India mu-Ethiopia Ui-Indonesia au-Malaysia	1.343 1.669 1.819 0.014	0.032 0.032 0.032 0.032	1.280 1.605 1.756 -0.049	1.405 1.731 1.880 0.076	508.742	0.000

Note: SE: Standard errors; CI: Confidence interval; a: Kruskal-Wallis test

To illustrate the magnitude of reduction of neck pain index during pre and post intervention. Figure 1 below showed participants from Indonesia recorded the highest reduction in neck pain index which achieved 50.9% from 3.39 to 1.81. The second highest reduction in neck pain index was participants from India which recorded 41.5% reduction in neck pain index from 3.69 to 2.16. The third highest reduction in neck pain index was participants from Ethiopia which achieved 34.5% from 4.00 to 2.62. The least reduction of neck pain index was reported from participants from Malaysia which recorded 18% from 2.11 to 1.73

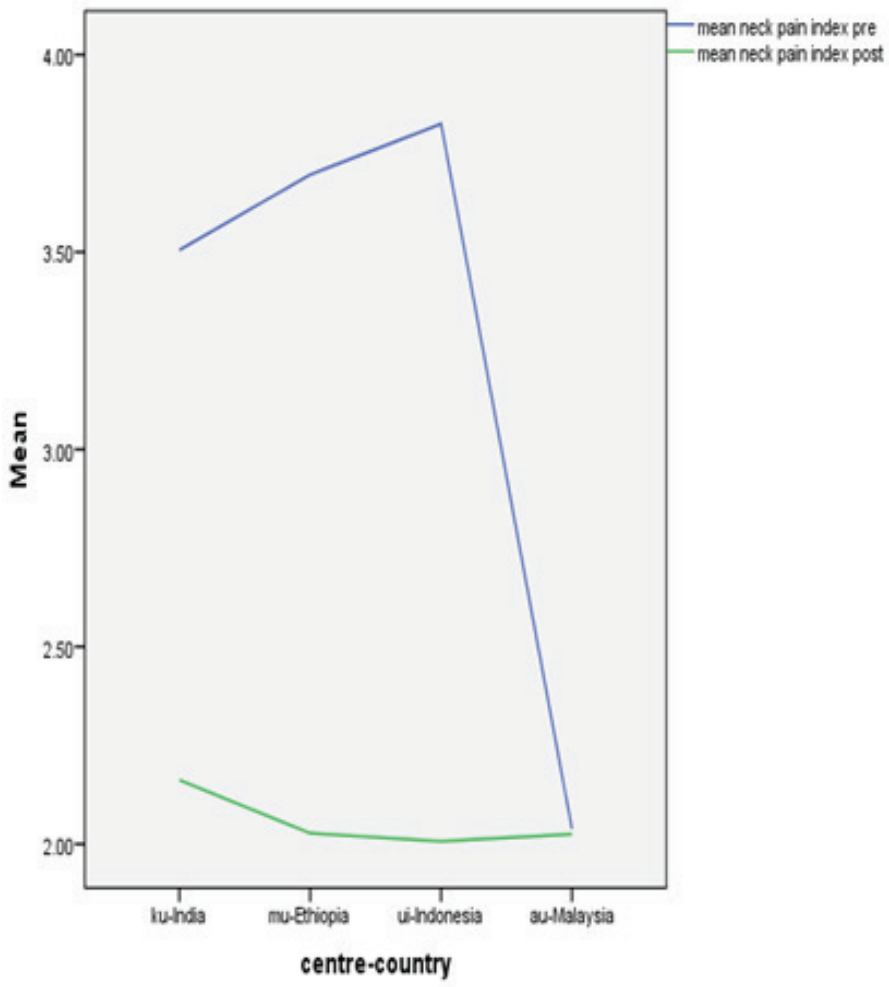

Figure 1: Neck pain intensity index pre and post intervention in 4 different countries

Discussion

Neuromuscular taping has been used as a therapeutic material in more developed countries; so many pilot studies have already been done on various clinical conditions like pain multiple sclerosis, phantom pain and other systemic problems. In this study, subjects were treated for neck pain and followed up for a period of 6-8 weeks [16]. With wide ranges of limitations, the result after series of statistical process shows evidence of reduction of parameters pain (VAS) in single blinded comparative study. Here by based on the result it can be concluded that the neuromuscular tapping is more effective in reduction of neck pain and can be considered as a treatment protocol for neck pain [17]. This data report could be considered an observational pilot study with the prospect to inform clinical practice [18], [19].

Conclusion

As the pain factor is reducing, considering the fact NMT can be included as one among the modalities used for the treatment of neck Pain. Introduction of new intervention such as neuromuscular taping in terms of neck pain management itself is a very challenging. The investigation of such studies and their result will help for further research prospective.

Ethical Clearance: No ethical approval is needed.

Source of Funding: Self

Conflict of Interest: Nil

References

1. Ariens GAM,BPM,DM,MMC, HWVdWG, BLM,VMW. Are neck flexion, neck rotation, and sitting at work risk factors for neck pain? Results of a prospective cohort study. JSTOR. 2001 March; 58(3): p. 200-207.
2. Ariens GAM, BPM, DM, MMC, HWVdWG, BLM,VMW. Are neck flexion, neck rotation, and sitting at work risk factors for neck pain? Results of a prospective cohort study. Contribution to Journal. 2011;: p. 200-207.
3. R A. Working posture and musculoskeletal problems of video Display Terminal Operators - review and reappraisal. AmIndHygAssoc J. 2011; 44: p. 437-446.
4. Bongers PM,IS,VdHS,BBM. Epidemiology of work related neck and upper limb problems: Psychosocial and personal risk factors (Part I) and effective interventions from a bio behavioural perspective. Journal of Occupational Rehabilitation. 2010; 16: p. 279-302.
5. Bovim G SHST. Neck pain in general population. Spine. 2014;: p. 191307 – 1300.
6. Brattberg G TMW. The prevalence of pain in a General Population. he results of a postal survey in a country of Sweden. Pain. 2014; 7(2): p. 215-222.
7. Borghours JAJ KVHBL. Cost-of-illness of Neck Pain in the Netherlands in. pain. 2013; 1999(80): p. 629 – 36.
8. Cote P CJCL. The Saskatchewan health and back pain. Spine. 2014; 23(15): p. 1689 -1698.
9. Guez M,HC,NM,TG(. The prevalence of Neck pain. ActaOrthopaedica Scandinavian Journal. 2013; 73(4): p. 455-459.
10. Grandjean HE MK. Constrained postures in accounting machine Operators. Appl Ergonomics. 2010; 11(3): p. 145-149.
11. Haartz JC,SMH. Work related musculoskeletal disorders. Prevention and intervention research at NIOSH. 2015.
12. Hush JM,MCG,RKM. Risk Factors for neck pain in office workers: A prospective study. BMC Musculoskeletal disorders. 2016; 7: p. 81.
13. Jensen I,HRK. Neck pain. Best Practice & Research Clinical Rheumatology. 2011; 21(1): p. 93-108.
14. Kamwendo K LSMU. Neck and shoulder disorders in Medical Secretaries. Scand J Rehab. 2011; 23: p. 127-133.
15. Kilbom. A BE. Health hazards related to ergonomic work Women Health. 2012; 13: p. 81 – 93.
16. Taping Neuro Muscolare Institute vGR. .
17. JICA country profile on disability, Federal Democratic Republic of Ethiopia. 2002.
18. International Labour Organization. 2014.
19. Katz R. Impairment and disability rating in low back pain. Clinical Occupational Environmental Medicine. 2006; 5(3): p. 719-740.
20. Anderson JAD. Back pain and their relation to work. 2012 May 11.