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TELEPHONE VERSUS USUAL CARE IN MANAGEMENT OF ACUTE WHIPLASH ASSOCIATED DISORDER: A PILOT STUDY

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ABSTRACT

Whiplash associated disorder (WAD) is a common and costly condition, and recommended management includes advice to "act as usual" and exercise. Providing this treatment through a telephonic intervention may help to improve access to care, and reduce costs. This pilot study assessed: (1) the effectiveness of a telephonic intervention for low grade WAD injuries; and (2) the comparison between this intervention and standard manual therapy. A quasi-experimental study design was implemented. Eighty-two (n=82) participants received the telephone remote intervention (RI), which included an exercise booklet and telephonic support every seven to 10 days for a period of 12 weeks. Forty-five (n=45) participants received standard manual therapy treatment (SMT). Outcome measures included pain rating, subjective range of movement and activities of daily living. Post-intervention follow-up outcomes were assessed telephonically for both groups at the end of the 12-week intervention period. A statistically significant improvement was found in all outcome measures in both the RI and SMT groups in the short term. No significant difference was found between the two interventions.

***Key words*:** Whiplash Associated Disorder; Management; Telephone; Manual therapy.

INTRODUCTION

Telephonic diagnosis and treatment is a possible solution for improving access to healthcare. One impetus for the development of telephone interventions was to decrease general practitioner (GP) workloads (Bunn *et al*., 2005; McCue *et al*., 2010). For example, the introduction of a telephonic nursing consultation service has been shown to decrease GP workload by up to 50% (Lattimer *et al*., 1998). Aimed at helping patients to self-manage, telephone interventions have reduced unnecessary demands on service provision (Bunn *et al*., 2005). In addition, provision of timely access to information and advice improves patient satisfaction (Taylor *et al*., 2002; Bunn *et al*., 2005). Furthermore, the conception of services, such as the National Health Service's *PhysioDirect* in the United Kingdom in 1998 (Foster *et al*., 2011) may provide potential cost and time saving (Ekeland *et al*., 2010).

As many of these remote management services have only been around for the last 20 years, it remains an emerging field of research. There is little evidence regarding the effectiveness of telephone interventions, and much of the research is of poor quality (Rogante *et al*., 2010;

Foster *et al*., 2011). The balance between efficiency and safety has yet to be established (Giesen *et al*., 2007). Concerns regarding quality of care and adverse events still remain high (Foster *et al*., 2011). Therefore, there is a clear need for directed research, specifically in the area of remote management of musculoskeletal conditions.

The most common conditions presenting in physiotherapy practices include back, neck and shoulder complaints (Foster *et al*., 2011). Research in the area of remote management has concentrated on lower back pain (Lau *et al.*, 2008), with very little evidence for other musculoskeletal conditions. One such condition that contributes significantly to disability and societal costs is Whiplash Associated Disorder (WAD). The incidence of WAD has significantly increased in the past three decades (Moore *et al*., 2005). However, there is still little consensus on a single appropriate treatment for WAD (Moore *et al*., 2005; Söderlund *et al*., 2009). In lower grade WAD injuries, it is generally accepted that treatment should involve an active approach, encouraging self-management, return to activities, exercises and education (Ferrari *et al*., 2005; Moore *et al*., 2005; Söderlund *et al*., 2009). Treatment that encourages clinician dependence and passive coping strategies is in fact associated with a poorer prognosis (Nicholas, 2008). Therefore, telephonic intervention may be a viable treatment option for the management of WAD injuries.

Physiotherapy-led telephone services are a relatively new area of research, aimed at improving patient outcomes by reducing waiting times. Timely access to these services is especially important, as early intervention is vital to prevent chronicity and absenteeism (Scholten-Peeters *et al*., 2002; Lau *et al*., 2008). These services offer an initial assessment and advice by telephone, usually supported by clinical algorithms (Zigenfus *et al*., 2000; Foster *et al*., 2011). They have been found to be a valid and reliable method of assessment, possibly comparable to that of face-to-face (Bishop *et al*., 2013). These interventions are proving to be an effective method of increasing physical activity levels in targeted populations (Marcus *et al*., 2006).

PURPOSE OF RESEARCH

The aim of this study was to assess the effect of remote telephone management in the treatment of Grade I and II WAD injuries and to compare telephone management versus standard face-to-face treatment in the management of low grade WAD injuries. Research comparing telephone interventions to usual, standardised physical therapy is still in its infancy stages.

METHODOLOGY

Participants

Participants referred to a private health insurance company for a WAD injury from a motor vehicle accident (MVA), through a third-party insurer, were invited to participate in the study. In line with a similar research protocol by Salisbury *et al*. (2009), the inclusion criteria were broad to maximise generalisability and reflect clinical practice (Table 1). Grade I and II WAD was diagnosed as per the Neck Pain Task Force guidelines (Carroll *et al*., 2009). Information regarding the study was provided, and informed consent was obtained telephonically. The study was approved by the Human Research Ethics Committee of the University of the Witwatersrand (Certificate number M140399).

Table 1. **INCLUSION AND EXCLUSION CRITERIA**

Inclusion criteria	Exclusion criteria
• 16 years and older • WAD Grade I or II • Acute injury (within 4 weeks)	• <16 years • Secondary injuries to the upper and/or lower limbs • WAD Grade III or IV • Patients requesting hands-on physiotherapy • Patients currently undergoing physiotherapy • Diagnosed psychological condition (depression)

Interventions

At baseline all participants were contacted telephonically by trained Physiotherapists, Biokineticists and Chiropractors. Demographic, accident and symptom information was gathered at the initial call. All participants received a "Guide to Whiplash" booklet via the post. The booklet was evidence-based (Scholten-Peeters *et al*., 2002; Moore *et al*., 2005; Mercer *et al*., 2007), and provided information regarding the injury, self-management techniques, as well as 7 stretching and 4 isometric neck strengthening exercises. All participants were provided with advice to "act as usual" and resume their activities of daily living as far as possible (Ferrari *et al*., 2005; Kongsted *et al*., 2007).

At the initial telephonic assessment, the sample group was then divided into the remote intervention (RI) group and the standard manual therapy (SMT) group. The RI group (n=82) were then contacted telephonically every 7 to 10 days, over a 12-week period, and provided with further advice and education. The SMT group (n=45) was provided with an initial physiotherapy assessment within 1 week of the initial telephone call. An average of 4.2±2.3 physiotherapy treatment sessions, with a maximum of 10 treatment sessions, was provided. The SMT is described elsewhere and consisted of mainly joint mobilisations, stretches, soft tissue massage and mobility exercises (Watson & Coopoo, 2011). Post-intervention follow-up outcomes were telephonically assessed at 12 weeks for both groups.

Outcome measures

There were 3 main outcome measures assessed in this study. Firstly, pain intensity of the neck was rated on the numerical pain rating scale (NPRS). This was scored out of a possible score of 10, with 0 being "no pain at all" and 10 being "worst pain ever experienced". Use of these scales have been shown to be a valid and clinically important outcome measure (Wewers & Lowe, 2007), and has been used in previous whiplash related studies (Söderlund *et al*., 2009; Michaleff *et al*., 2014). Secondly, Range of Movement (ROM) of the neck was subjectively assessed. This was done by asking the patient "Out of a possible 0 and 100% movement (with 100% being normal pre-injury movement), how much movement do you feel you currently have?" Thirdly, activities of daily living (ADL's) were assessed. Participants rated themselves on 4 items: personal care; housework; driving; sleeping; and leisure activities (sport and recreation). Each item was scored on a 4-point Likert rating, ranging from 1 being "not affected" and 4 being "significantly affected" (Femia *et al*., 1997). The composite score of all these measures (out of a possible 16) was then calculated to give a score for general activities

of daily living (GADLS). Demographic, occupation, accident, medication and other treatment details were also gathered at baseline.

Statistical analysis

For ordinal data, the median scores were calculated and displayed with the ranges. Non-normally distributed continuous data was log transformed for analysis. For ordinal data or data that remained non-normally distributed after transformation, a Mann-Whitney U-test for independent data and a Wilcoxon rank sum for paired data was used. For normally distributed continuous data, t-tests were used. A statistical significance of $p<0.05$ was accepted for all analyses. All analyses were done using STATISTICA (Version 11, Tulsa, USA) statistical package.

RESULTS

The study included 127 (65%) of the possible 191 participants that were assessed for eligibility. Participants were excluded when they specifically requested to be seen by a physiotherapist (n=20), missing data (n=12), chronic WAD (n=28) and no consent (n=4).

Table 2. **BASELINE CHARACTERISTICS OF PARTICIPANTS**

Demographic characteristics	**RI group** (n=82)	**SMT group** (n=45)
Age [M±SD years]	38.8±14.4	41.0±14.4
Gender [n(%)]		
Male	47 (57%)	26 (58%)
Female	35 (43%)	19 (42%)
Occupation [n(%)]		
Employed	68 (83%)	36 (80%)
At work	54 (66%)	28 (62%)
Off work	13 (16%)	8 (18%)
Light duties	1 (1%)	—
Unemployed	9 (11%)	5 (11%)
Student	3 (4%)	1 (2%)
Retired	2 (2%)	3 (7%)
Accident details [n(%)]		
Rear end	53 (65%)	31 (69%)
Side impact	20 (24%)	11 (24%)
Front impact	3 (4%)	3 (7%)
Head-on	4 (5%)	—
Other	2 (2%)	—

RI=Remote Intervention SMT=Standardise Manual Treatment

Eighty-two (65%) patients received telephone advice and remote monitoring of exercises. Forty-five (35%) patients received standardised manual therapy. Table 2 depicts demographic characteristics of the participants. The mean age (years) for the RI group was 38.8±14.4 and

41.0±14.4 for the SMT group, with no significant difference in age between the groups (p=0.338). At baseline, there were no significant differences in pain (p=0.064), ROM (p=0.772) and GADLS (p=0.198) between the RI and SMT groups. Gender, occupation and accident details are also shown in Table 2. There were marginally more males in both groups than females. Both the RI and SMT group showed the majority of the participants were currently employed and at work (66% and 62% respectively). The most common type of accident was a rear end motor vehicle collision, reported in 65% of the RI and 69% of the SMT groups, respectively.

Table 3. **PRE- AND POST INTERVENTION OUTCOMES**

Outcomes	Remote Intervention (RI) Group (n=82)			Standard Manual Therapy (SMT) Group (n=45)			Difference at discharge p-Value
	Baseline Mean±SD	Discharge Mean±SD	p-Value	Baseline Mean±SD	Discharge Mean±SD	p-Value	
NPRS	5.7±1.5	2.1±1.6	0.01*	6.2±1.7	1.4±1.6	0.01*	0.139
ROM	71.9±22.2	97.2±8.9	0.01*	73.5±16.1	92.2±12.3	0.01*	0.156
GADLS	8 (2)#	5 (3)#	0.01*	9 (3)#	4 (1)#	0.01*	0.198
Daily living activities	Med(IQR)	Med(IQR)		Med(IQR)	Med(IQR)		
Personal care	2 (1)	1(0)	0.01*	2(1)	1(0)	0.01*	
Driving	2 (2)	1(1)	0.01*	2(1)	1(0)	0.01*	
Sleeping	2 (2)	1(1)	0.01*	2(1)	1(0)	0.01*	
Leisure activities	2 (2)	1(1)	0.01*	2(2)	1(0)	0.01*	

NPRS: Numerical Pain Rating Scale GADLS: General Activities of Daily Living Scale Med=Median
ROM: Range of movement * Significance=p<0.05 IQR=Interquartile Range # =Median (IQR)

Table 3 shows the mean difference in outcome measures from baseline to discharge. The RI group showed significant improvements from pre- to post-intervention on all 3 outcome measures, namely pain (p=0.01), ROM (p=0.01) and GADLS (p=0.01). The SMT group also showed significant improvements from pre- to post intervention in the same 3 outcome measures. A clinically important decrease in pain of at least 30% (Cepeda *et al*., 2003) was obtained in 87% of the participants in the SMT group and 70% in the RI group. Statistically, no difference was found between the RI and SMT groups for NPRS (p=0.139), ROM (p=0.156) or GADLS (p=0.198) at discharge.

DISCUSSION

The aim of this pilot study was to trial the effects of a telephone intervention for acute low-grade WAD in order to provide tentative results to guide further study design. This study showed short term improvements in pain, subjective ROM and ADL's with both remote intervention and standard manual therapy. No significant differences were found between the two interventions. Robust evidence is needed on the alternative approaches to the provision of physiotherapy services. Telephone interventions and remote monitoring may play a major role in reducing workload whilst providing time and cost saving (Salisbury *et al*., 2009).

These innovative interventions may be particularly useful in certain conditions, such as a low-grade WAD injury, where manual therapy may offer little benefit over advice, education and exercise. Recommendations for acute WAD injuries include active exercise, self-management and a return to normal activities (Mercer *et al.*, 2007). Physiotherapy appears to be useful in the event that symptoms persist (Mercer *et al*., 2007; Lamb *et al*., 2012). Otherwise, patients should be provided with an advice sheet and home exercises (Logan & Holt, 2003). These home exercises should be initiated and supported by a physiotherapist (Rosenfeld *et al*., 2003). These recommendations are what led the researchers to hypothesise an alternative, possibly cheaper, way of delivering this care.

In this small non-randomised study, between-group change showed that the RI group performed as well as the SMT group at 12 weeks. Both the SMT group and the RI group had improved pain relief (87 & 70%, respectively). Similarly, in a study of 172 participants, Michaleff *et al*. (2014) found advice to be just as effective as a comprehensive exercise programme to reduce pain in chronic WAD patients. Other remote interventions, such as educational videos or pamphlets, have also been shown to improve function after a WAD injury (Carragee *et al*., 2008). Thus, remote interventions may lead to similar outcomes when compared to standard care (Ferrari *et al.*, 2005). Indeed, Kongsted *et al*. (2007) showed little differences between immobilisation, "act as usual" advice and mobilisation in the treatment of pain following a WAD injury.

In addition, other studies have shown that a well-planned, structured unsupervised exercise is comparative to supervised, standard care in properly selected patients (Jokl *et al*., 1989; Beard & Dodd, 1998). In economic terms alone, the potential savings of these types of services are tremendous. In fact, in a large scale randomised controlled trial, Lamb *et al*. (2012) found that physiotherapy treatment provided small, short term benefits in neck disability when compared to an advice session alone. Therefore, it appears that the evidence is lacking for using only one specific treatment for WAD. Referrals to supervised physiotherapy may be warranted if significant symptoms are present or persist (Mercer *et al*., 2007; Lamb *et al*., 2012) and long-term follow up is warranted for remote interventions to ensure safety and assess the reoccurrence of pain or symptoms. As mentioned in previous studies, clinicians should also be aware that patients who lack motivation or discipline, may require supervised treatment (Jokl *et al*., 1989). However, clinicians should avoid promoting frequent visits, as this may encourage passive coping strategies and dependence (Cote *et al*., 2005).

This study has several limitations. Firstly, further studies should adopt a more rigorous study design, such as a randomised controlled trial. This will reduce bias and control potential confounders within the results. Secondly, the study was limited by the health insurance company as to which outcome measures could be used. Although many of the outcome measures had been used in previous studies, there are limitations in the use of subjective measures of pain, disability and range of motion. However, this was the most feasible method to telephonically assess the outcomes within the restraints of a private insurance company setting (Shinar *et al*., 1987; Angst *et al*., 2004). The use of more robust outcome measures such as the Neck Disability Index (NDI) is warranted.

CONCLUSION

In this small pilot study, the researchers found no significant differences between the effectiveness of the two interventions, with the telephone intervention presenting a potentially cheaper option. Further research should aim to conduct a cost effective analysis to determine whether the costs of treating acute low-grade WAD patients will be alleviated with a well-structured telephone-supported home programme. This study forms a basis from which to formulate further research, specifically a randomised controlled trial, which would add to the growing literature on the benefits of these types of services (Jokl *et al*., 1989; Söderlund *et al*., 2009). Further randomised controlled trials should address the effects of telephone assessment and advice versus supervised physiotherapy in reducing pain and improving ROM and function, in patients with acute WAD.

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