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Journal of Medical Rehabilitation Science, Volume 1. Issue 1, pp:39 Pages (2024) ISSN:

Volume 1. Issue 1

Journal of Medical Rehabilitation Science

Scientific Publishing Center

King Abdulaziz University

P.O. Box 80200, Jeddah 21589

Saudi Arabia

http://spc.kau.edu.sa

Editorial Board

Journal of Medical Rehabilitation Science, Volume 1. Issue 1, pp:39 Pages (2024) ISSN:

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Journal of Medical Rehabilitation Science, Volume 1. Issue 1, pp: 1 – 3 (2024)

Inaugural Editorial

Charting a New Course in Medical Rehabilitation Sciences

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Submission: 01-07-2024
Accepted: 20-08-2024
Published: 01-09-2024

This article can be accessed online at: https://journals.kau.edu.sa/index.php/JRS/index
Doi: 10.4197/Mrs.1-1.1

The need to improve the quality of life and address current challenges in medical rehabilitation has increased the demand for new journals in the field of medical rehabilitation sciences. There is also a growing need for high-quality, peer-reviewed research in rehabilitation sciences to address these issues adequately. We are, therefore, delighted to present the inaugural issue of a newly established healthcare journal. The Journal of Medical Rehabilitation Sciences (J Med Rehab Sci), sponsored by the Faculty of Medical Rehabilitation Sciences at King Abdulaziz University, is a peer-reviewed publication designed to make significant contributions to the enrichment of knowledge and improvement of healthcare services within the scope of medical rehabilitation. It is hoped that this scientific contribution will lead to better healthcare services and improved patient outcomes. The J Med Rehab Sci aims to provide a platform for valuable and landmark research, shaping the future of medical rehabilitation. More importantly, the journal also aims to foster interdisciplinary collaboration and enhance evidence-based medicine.

All categories of medical rehabilitation research, encompassing various disciplines such as physical therapy, occupational therapy, respiratory therapy, speech and communication disorders, audiology, prosthetics, and orthotics, among others, are considered within the scope of J Med Rehab Sci. This journal welcomes both fundamental and clinical research, with a particular emphasis on translational research to bridge the gap between laboratory findings and clinical application. Authors can submit their manuscripts electronically via the journal's website. Both authors and co-authors can track and monitor their submissions electronically (https://journals.kau.edu.sa/index.php/JRS/index). Accepted manuscripts will be freely available on the journal's website immediately upon publication.

One of our primary objectives on the editorial board is to ensure and maintain rigorous peer review processes while protecting the highest standards of scientific integrity and quality. We are also committed to adhering to ethical guidelines for publication. Our editorial board is composed of distinguished national and international experts from a range of medical rehabilitation-related fields. Our editors will guide the journal's trajectory and uphold the values of excellence and transparency. Undoubtedly, they will work towards maintaining very high standards, ensuring that the journal's articles are scientifically reliable and of substantial scholarly value.

In this inaugural issue, readers will hopefully enjoy a diverse array of manuscripts presenting the breadth and depth of current medical rehabilitation research. Our goal is to provide valuable insights with the potential to drive progress and inspire the future.

These might range from innovative therapeutics and diagnostic procedures to astute critiques and insightful commentaries.

How to cite this article: Al-Otaibi HM. Charting a New Course in Medical Rehabilitation Sciences. J Med Rehab Sci. 2024;1(1):1-3.

The establishment of this journal and the production of the inaugural issue is a historic moment for all researchers and clinicians with an interest in medical rehabilitation. Therefore, on behalf of our editorial board, I would like to express our deepest gratitude to the authors, contributors, and reviewers who have made the launch of J Med Rehab Sci possible. We expect the anticipated success of J Med Rehab Sci to stem from our dedication and passion, which will significantly contribute to the advancement of medical rehabilitation sciences. As such, I would like to seize this opportunity and invite researchers, clinicians, academicians, and healthcare professionals with a genuine interest in medical rehabilitation sciences to engage with our content, share their discoveries, and participate in enriching and enhancing the field, which will ultimately shape the future of our journal. Together, we hope to shape the next chapter of medical rehabilitation science and practice.

Lastly, we want to extend a sincere welcome to all of you to J Med Rehab Sci. We eagerly anticipate a future of groundbreaking findings and significant advancements in the field of medical rehabilitation sciences.

Sincerely,

Hajed M. Al-Otaibi
Editor-in-Chief, Journal of Medical Rehabilitation Sciences

Ethical approval statement

Not applicable

Financial support and sponsorship

Not applicable

Conflicts of interest

The author reports there are no competing interests to declare.

الافتتاحية: رسم مسار جديد في علوم التأهيل الطبي

هاجد مرزوق العتيبي

قسم العلاج التنفسي، كلية علوم التأهيل الطبي، جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية

أدت الحاجة إلى تحسين جودة الحياة ومواجهة التحديات الحالية في التأهيل الطبي إلى زيادة الطلب على المجلات العلمية الجديدة في مجال علوم التأهيل الطبي. كما أن هناك أيضا حاجة متزايدة لإجراء أبحاث عالية الجودة في علوم التأهيل الطبي لمعالجة هذه القضايا بشكل مناسب. لذلك ، يسعدنا أن نقدم العدد الافتتاحي من مجلة علوم التأهيل الطبي، والتي ترعاها كلية علوم التأهيل الطبي بجامعة الملك عبد العزيز، وهي عبارة عن مجلة علمية محكمة تهدف إلى تقديم مساهمات كبيرة في إثراء المعرفة وتحسين خدمات الرعاية الصحية في نطاق التأهيل الطبي. ومن المأمول أن تؤدي هذه المساهمات العلمية إلى تحسين خدمات الرعاية الصحية وتحسين نتائج المرضى. كما تهدف مجلة علوم التأهيل الطبي إلى توفير منصة للأبحاث القيمة والبارزة ، وتشكيل مستقبل التأهيل الطبي. والأهم من ذلك ، تهدف المجلة أيضا إلى تعزيز التعاون بين التخصصات المتعددة وتعزيز الطب القائم على الأدلة.

تعتبر جميع فئات أبحاث التأهيل الطبي ، والتي تشمل تخصصات مختلفة مثل العلاج الطبيعي ، والعلاج الوظيفي ، والعلاج التنفسي ، واضطرابات النطق والسمع والتواصل ، والأطراف الصناعية والاجهزة التعويضية، وتخصصات اخرى مشابهة، ضمن نطاق مجلة علوم التأهيل الطبي. كما ترحب هذه المجلة بجميع البحوث الأساسية والسريرية، مع التركيز بشكل خاص على البحوث الانتقالية لسد الفجوة بين النتائج المخبرية والتطبيق السريري. ويجدر الاشارة الى أنه يمكن للمؤلفين تقديم مخطوطاتهم إلكترونيا عبر موقع المجلة. حيث يمكن للمؤلفين والمؤلفين المشاركين تتبع ومراقبة طلباتهم إلكترونيا عبر هذا الرابط (https://journals.kau.edu.sa/index.php/JRS/index). مع العلم بأن جميع الاوراق العلمية المقبولة سوف تكون متاحة مجانا على موقع المجلة فور نشرها.

Review Article

Extracorporeal Shock Wave Therapy for Children and Adolescents Diagnosed with Osgood Schlatter Disease to Reduce Knee Pain: Systematic Review

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Submission: 04-12-2023
Accepted: 26-08-2024
Published: 01-09-2024

This article can be accessed online at: https://journals.kau.edu.sa/index.php/JRS/index
Doi: 10.4197/Mrs.1-1.2

Abstract:

AIM: The current systematic review aimed to investigate the effectiveness of ESWT on children and adolescents diagnosed with OSD to reduce their knee pain.
METHODS: An electronic search for studies about ESWT on patients with OSD that were published in English in different databases (CINAHL, PubMed, MEDLINE, Scopus, and PEDro). National Heart, Lung, and Blood Institute's Quality assessment tool was used to evaluate the included studies.
RESULTS: According to the search strategy, from 2807 articles, only 2 studies (retrospective cohort and RCT) were selected for the current review, with a total of 34 subjects (20 Males and 14 Females) diagnosed with OSD participated to be treated with ESWT. They were aged between 12 to 29 years old. all participants were suffering from pain due to OSD.
CONCLUSION: The available evidence suggests that there is a promising effect of using ESWT for patients diagnosed with OSD to reduce their pain. However, the paucity of evidence prevents drawing firm conclusions, necessitating more studies to be conducted for a definite conclusion.
Keywords: Extracorporeal Shock Wave Therapy; Rehabilitation; Pain; Adolescents; Children.

Introduction

Osgood Schlatter Disease (OSD) is a common condition that affects the knee joint in children and adolescents between the age of 10 to 15 years old, 10 to 12 in girls and 12 to 15 in boys. OSD occurs in male more than female with 9.8% [11.4% in males, 8.3% in females] of prevalence [1]. The incidence of OSD range from 12.4 to 22.5 per 1000 athletic adolescents [2]. This condition is a type of overuse injury that occurs due to repetitive stress on the patellar tendon, it is characterized by pain and swelling in the bony prominent of proximal tibia just below the knee cap, which known as tibial tubercle [3]. The tibial tubercle starts to swell as a secondary ossification center that attaches the patellar tendon. The swelling minimize the flexibility of muscles and tendons around the knee joint specially the quadriceps [4]. OSD can be exacerbated due to activities that require repetitive extensor mechanism such as running, jumping, or

How to cite this article: Tamboosi ME, Alharthi HT, Bukhari AA, et. al. Extracorporeal Shock Wave Therapy for Children and Adolescents Diagnosed with Osgood Schlatter Disease to Reduce Knee Pain: Systematic Review. J Med Rehab Sci. 2024;1(1):4-12.

squatting. Different sport activities can cause the repetitive extensor mechanism such as

running, jumping, or squatting. Different sport activities can cause the repetitive extensor mechanism such as basketball, volleyball, sprinters, gymnastics, and football [1]. While OSD is a self-limiting condition that typically resolves on its own within a few months to a year, it can cause significant discomfort and limitations in physical activity during that time. In some cases, the condition may persist into adulthood or lead to chronic pain and muscles weakness [5]. Additionally, OSD may also lead to long-term complications such as pseudo-arthrodesis, genu recurvatum, patella alta, fragmentation-migration of bone fragments, and reduced knee flexion [6].

Diagnosis of OSD is typically based on a combination of clinical examination, imaging studies, and assessment of the patient's medical history and physical activity [5]. The main symptom of OSD is pain with a variety of intensity which worsens when the location is pressed especially in postures like kneeling [7]. Furthermore, the anterior tibial tuberosity, where the patellar tendon enters, frequently exhibits inflammation and hypersensitivity. This is especially noticeable during physical and sports practice and may seem as limping. In the acute stage, symptoms often progress progressively from mild and infrequent to severe and ongoing pain [8].

Palpable thickening of the patellar tendon insertion is frequently accompanied by discomfort, especially while performing counter-resisted flexions or resisted knee extensions, as well as the quadriceps and hamstring muscles loss of flexibility can be detected during examining the flexibility of the knee muscles [9]. OSD should be confirmed by complementary radiological tests such as X-ray, MRI, and Ultrasound to differentiate and to rule out other diagnosis such as fractures, tumors, infections, tendinitis, or Hoffa's disease [10].

In a recent study, OSD patients had great success rates (80% at 12 weeks and 90% at 12 months), with 16% returning to sport after 12 weeks and 67% after 6 months [11]. Another study reported that 90% of OSD patients who had conservative care such as decreased in physical activities, ice application, pressure application, orthosis, warm-up and cool-down exercise, and stretching exercise for quadriceps, hamstring, gastrocnemius, and iliotibial band had entirely healed from their symptoms in about a year, although the strength and functioning deficiencies could persist over time [12–17]. Furthermore, the repetitive stress activities should be replaced with other activities that does not require a stress on the patellar tubercle such as swimming and pedaling, which not cause any load to the tendon [18]. Core muscles stabilization and strengthening is recommended to improve knee functions [19].

Medical intervention such as non-steroidal anti-inflammatory drugs (NSAID) can be efficient for OSD to minimize the pain and improve the symptoms [1]. Despite taking the drugs may enhance in decreasing the symptoms, but they would not shorten the course of OSD [20]. Surgical intervention by removing the ossicle and adjacent bursae, smoothing the bump, and repairing the patellar tending to bone would be the best solution for unresolved OSD with a rate of 100% of success [21,22].

On the other hand, Extracorporeal Shock Wave Therapy (ESWT) is an option for alternative therapies to treat OSD, which does not require a surgeries and cause tissue damage [23]. Recent study reported that ESWT is a safe and promising intervention for patients with OSD [23]. ESWT is a non-invasive intervention used to treat a variety of injuries and painful conditions. The waves are created by compassed air to the affected region produce energy that promotes regeneration and reparative processes of the bones, tendons and other soft tissues [24].

The current study aims to investigate the effectiveness of ESWT to enhance minimizing the symptoms of OSD by assessing and synthesizing the studies that applied ESWT for children and adolescents with OSD, which include the effective parameters of ESWT that should be applied for OSD, and the outcome measures used to assess the symptoms whether minimized nor not.

Materials and Methods

Study Design:

Systematic review; the current study was conducted according to the Preferred Reporting Item for Systematic reviews and Meta-Analysis (PRISMA) statement [25].

Search Strategy

The following databases were used to conduct an electronic search for studies about ESWT on patients with OSD that were published in English, every set search contained subject heading (MeSH) that were combined by “AND” in CINAHL, PubMed, MEDLINE, Scopus, and PEDro from 2010 to 2023. A summary of the search procedure is provided in (Table 1). A flow diagram was included to demonstrate how the information from the collected data flowed.

Inclusion Criteria:

The following inclusion criteria were established using the PICOS framework [Population, Intervention, Comparison/Control, and Study Design]: Patients were diagnosed with OSD who aged from 6 to 29 years old [P]; Interventions included ESWT as a treatment for OSD whether a primary treatment or secondary treatment [I]; ESWT compared with a further intervention or no treatment if applicable [C];Evaluation of at least one of the following results: pain or discomfort, the length of the symptoms, function (such as the ability to kneel), range of motion, muscle flexibility, or sport activity [O]; the selected study design was an experimental or observational study design either a prospective or retrospective cohort studies, a case study or case series, or a randomized control study were selected to be included in this project [S] [26].

Database	Keywords
PubMed CINAHL MEDLINE Scopus	• Osgood Schlatter AND Shock Wave • Osgood Schlatter AND Extracorporeal Shock Wave Therapy • Osgood Schlatter AND Rehabilitation • Osgood Schlatter AND Physiotherapy
PEDro	• Osgood Schlatter* Shock Wave* • Osgood Schlatter* Extracorporeal Shock Wave Therapy* • Osgood Schlatter* Rehabilitation* • Osgood Schlatter* Physiotherapy*

Table 1: Keywords/terms used for electronic database search

Exclusion Criteria:

Only records that written in English were included, any other languages were excluded. Further, animal studies, assessment or diagnostic studies, studies that focused in other outcomes such as cost-effectiveness of the intervention, and studies that published prior to 2010 were also excluded.

Data Extraction:

The extracted data from the selected studies include the citation details, study design, participants characteristics [Number of participants, Age, Gender, and Condition], the concluded outcomes, and the parameters and the duration of the intervention, and the outcome measures used in the selected studies.

Quality Assessment:

The selected studies were assessed independently by 2 assessors [M.E.T and H.T.A] using the National Heart, Lungs, and Blood institute's quality assessment tool to assess the quality of the selected studies. National Heart, Lungs, and Blood institute (NHLBI) created a set of specialized quality evaluation tools in 2013.

NHLBI provided a variety of quality assessment tools for different study designs. The tools were developed to screen for potential problems in the implementation or use of certain study designs. NHLBI offers the tools through the website [https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools].

Data Analysis:

A qualitative analysis was not applicable due to the heterogeneity of the included studies [e.g., various study designs, outcome measures, and data quality]. However, the data were synthesized in a narrative fashion.

Results

Literature Search and Screening Process:

The process search strategy and article screening procedure were performed in this review. 2807 articles were found after searching electronic databases. 2633 duplicates were removed, and 174 articles were screened. After evaluating the full texts of the relevant articles, only 2 studies met the criteria for eligibility requirements. [Figure 1] demonstrates the process of searching and screening strategy.

Characteristics of the included studies:

The included studies applied ESWT on OSD with a variety of parameters. 34 participants who participated in the included studies, as well as they were all diagnosed with OSD. The ages of the participants ranged between 12 to 29 years old. Both studies reported that there was an improvement while applying ESWT on OSD. [Table 2] summarizes the findings of the selected studies.

The study [23] reported that ESWT is a promising and safe intervention that can be used to improve the symptoms of OSD. Further, the study [27] reported in their findings that applying ESWT can minimize pain and improve the functions for cases diagnosed with OSD. The designs of the selected studies were pilot cohort study and Randomized Control Trial (RCT) respectively.

[27] compared ESWT to interferential current therapy for adolescents diagnosed with OSD, which also demonstrated

an improvement in the range of motion (ROM) and the score of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). However, they reported that there was a significant improvement in the mean value of total WOMAC measured in the group that received ESWT.

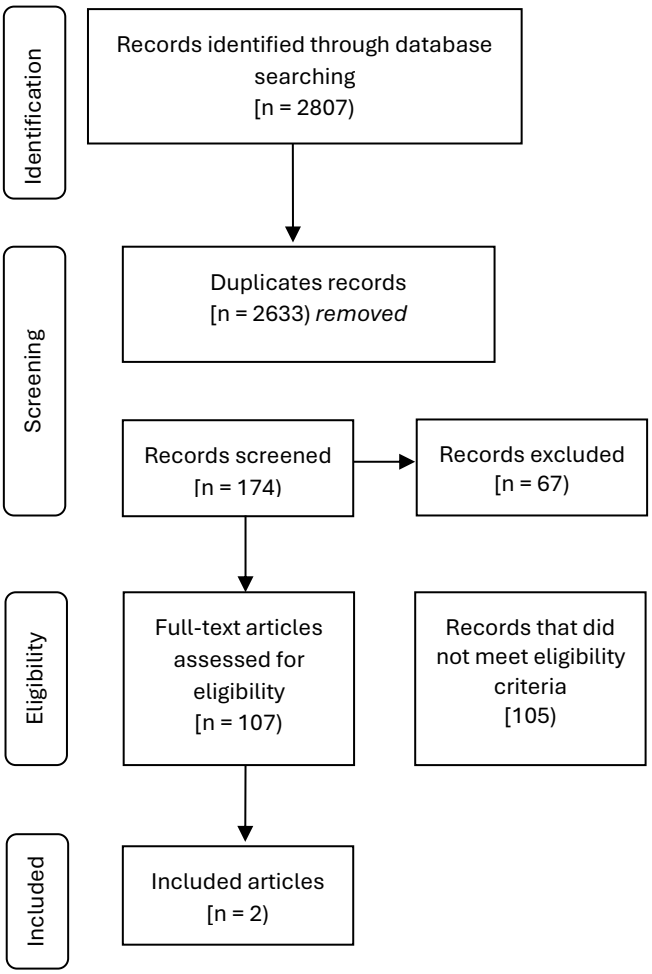

Figure 1: Flow diagram depicting search strategy and articles selection process

Table 2: Characteristics of the Included Studies

Reference	Year	Study Design	Participants Characteristics				Control Group	Outcomes	Outcome Measures	Findings
			N	Age	Gender	Condition				
Lohrer et al.	2012	Pilot Cohort Study	14	15 - 29 y	9 Male 5 Female	OSD	N/A	- Pain - Function	VISA-PG questionnaire	Adolescents with OSD have a safe and effective therapy option in ESWT
Gazya et al.	2014	RCT	40	12 – 14 y	22 Male 18 Female	OSD	Interferential Current Therapy N = 20	- Pain - Stiffness - Physical Function	- VAS - WOMAC	ESWT can be used to decrease pain of OSD

***ESWT** = Extracorporeal Shock Wave Therapy*
***N** = Number of Participants*
***N/A** = Not Applicable*
***OSD** = Osgood Schlatter Disease*
***RCT** = Randomized Control Trial*
***VAS** = Visual Analog Scale*
***VISA-PG** = Victorian institute of Sport Assessment Questionnaire*
***WOMAC** = Western Ontario and McMaster Universities Osteoarthritis Index*

(Table 3) Application of Extracorporeal Shock Wave Therapy

Reference	Device Model	Working Pressure	Contact Pressure	Analgesia	Pulses	Frequency	Duration
Gazya et al.	Gymna ShockMaster 500	0.18 mJ/mm2	Medium	No	2000 pulses	160 pulses/min	8 weeks
Lohrer et al.	DolorClast® Radial Shock Waves	0.06 to 0.09 mJ/mm2	Medium	No	1500 - 2000 Pulses	300 pulses/min	3-7 sessions, once/week

min = *Minute*
mJ/mm2 = *Energy Flux Density*

Application of Extracorporeal Shock Wave Therapy:

[23,27] applied different device model; Gymna ShockMaster 500, and DolorClast® Radial Shock Waves respectively. Furthermore, the working pressure was different (0.18mJ/mm2; 0.06 to 0.09 mJ/mm2), the contact pressure was "Medium" in both studies. Additionally, there was no analgesia in the treatment area and the pulse was from 1500 to 200 in both studies, while the frequency of the intervention was 160 pulses/min and 300 pulses/min respectively. The duration of the intervention varied between 3 to 8 weeks (Lohrer et al. applied the intervention for 3 to 7 weeks, and Gazya et al. applied it for 8 weeks). (Table 3) summarizes the application of ESWT in each study.

Outcome measures:

The study [27] selected visual Analog Scale [VAS] to measure the pain, and Western Ontario and McMaster Universities Osteoarthritis Index (WOMA)] to measure the functions. While [23] used Victorian institute of Sport Assessment Questionnaire (VISA-PG). The selected outcome measures were reviewed. Further, the psychometric properties such as validity and reliability were assessed.

Visual Analog Scale (VAS): The pain VAS is a unidimensional way to asess how much pain a person is expereincing. It may also be sued to evaluate level if pain in induviduals with comparable diseases. In several adult groups, VAS has been widely utilized [28]. Usually, VAS can assess patients with the age range between 18 to 65 years old. it showed an Adequate test re-test reliability (ICC=0.48) [29].

Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC): WOMAC index was created for hip and knee osteoarthritis. However, it has also been used to measure other rheumatic illnesses, including fibromyalgia, systemic lupus erythematosus, rheumatoid

Table 4: NHLBI Quality Assessment of Controlled Intervention Studies

Criteria	Yes	No	Other [CD, NR, NA] *
1. Was the study described as randomized, a randomized trial, a randomized clinical trial, or an RCT?	✓		
2. Was the method of randomization adequate [i.e., use of randomly generated assignment]?	✓		
3. Was the treatment allocation concealed [so that assignments could not be predicted]?		✓	
4. Were study participants and providers blinded to treatment group assignment?		✓	
5. Were the people assessing the outcomes blinded to the participants' group assignments?		✓	
6. Were the groups similar at baseline on important characteristics that could affect outcomes [e.g., demographics, risk factors, co-morbid conditions]?	✓		
7. Was the overall drop-out rate from the study at endpoint 20% or lower of the number allocated to treatment?	✓		
8. Was the differential drop-out rate [between treatment groups] at endpoint 15 percentage points or lower?	✓		
9. Was there high adherence to the intervention protocols for each treatment group?	✓		
10. Were other interventions avoided or similar in the groups [e.g., similar background treatments]?	✓		
11. Were outcomes assessed using valid and reliable measures, implemented consistently across all study participants?	✓		
12. Did the authors report that the sample size was sufficiently large to be able to detect a difference in the main outcome between groups with at least 80% power?		✓	
13. Were outcomes reported or subgroups analyzed prespecified [i.e., identified before analyses were conducted]?	✓		
14. Were all randomized participants analyzed in the group to which they were originally assigned, i.e., did they use an intention-to-treat analysis?	✓		

arthritis, and low back pain [30]. WOMAC showed an excellent test-retest reliability (ICC 0.77 – 0.94]) and excellent negative construct validity with SF-36 physical function(r=0.73) [31].

Victorian institute of Sport Assessment Questionnaire (VISA-PG): VISA-PG is a straightforward, useful questionnaire-based severity index that will aid in the study of jumper's knees and, consequently, theraputic therapy. VISA-PG has excellent test-retest reliability (ICC=0.97). According to the construct validity, the differences between scores of the patients, healthy students, and basketball players were statistically significant: P<0.001 [32].

Quality assessment:

The selected studies were assessed using NHLBI quality assessment tool. Moreover, the quality assessment of both studies demonstrated a Good quality with a rate of 10 "YES" answers for [27] and 9 "YES" answers for [23]. The performance of quality assessment for [27] is demonstrated in (Table 4), as well as the performance of quality assessment for [23] is demonstrated in [Table 5]. Furthermore, both studies were assessed independently by 2 authors (M.E.T and H.T.A). The outcomes of the assessment by both assessors were similar.

Table 5: NHLBI Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

Criteria	Yes	No	Other [CD, NR, NA] *
1. Was the research question or objective in this paper clearly stated?	✓		
2. Was the study population clearly specified and defined?	✓		
3. Was the participation rate of eligible persons at least 50%?	✓		
4. Were all the subjects selected or recruited from the same or similar populations [including the same time period]? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?		✓	
5. Was a sample size justification, power description, or variance and effect estimates provided?		✓	
6. For the analyses in this paper, were the exposure[s] of interest measured prior to the outcome[s] being measured?	✓		
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	✓		
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome [e.g., categories of exposure, or exposure measured as continuous variable]?		✓	
9. Were the exposure measures [independent variables] clearly defined, valid, reliable, and implemented consistently across all study participants?	✓		
10. Was the exposure[s] assessed more than once over time?	✓		
11. Were the outcome measures [dependent variables] clearly defined, valid, reliable, and implemented consistently across all study participants?	✓		
12. Were the outcome assessors blinded to the exposure status of participants?		✓	
13. Was loss to follow-up after baseline 20% or less?	✓		
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure[s] and outcome[s]?		✓	

Discussion

The current review aimed to investigate the effectiveness of ESWT for children and adolescents athletes diagnosed with OSD and to describe the ESWT characteristics that are used to treat the intended population.

The main findings of the selected studies showed that ESWT is an effective intervention for patients diagnosed with OSD. [23] concluded that ESWT considered as a safe and promising physiotherapy intervention to treat patients with OSD. However, the study design is pilot retrospective, the risk of bias is extremely possible for such designs specially with the absence of longitudinal nature of data as the study [33] mentioned in their paper.

On the other hand, [27] reported in their conclusion that ESWT can be used to treat patients with OSD to decrease pain and to restore functions. The desgin of their study was RCT. However, the risk of bias can be detected in this study, as the patients, assessors and the therapists were not blinded, and this factor might affect the results of their study negatively. The study [34] reported that lack of blinding leads to overestimated treatment effects.

Sports that requires requiring repetitve extensor movmenets like sprinting, leaping, or squating might lead OSD worse [1], the participants in the selected studies were athletes from different sport activities such as football, tennis, hockey, discus throw, and figure skating.

In order to distinguish between OSD and other diagnoses like fractures, tumors, infections, tenderness, or Hoffa's disease, supplementary radiological studies like X-ray, MRI and Ultrasound should be used to confirm the diagnosis [10]. All participants in the selected studies confirmed the diagnosis of OSD using MRI.

Replacing the repetitive stress activities with ones that do not require stress on the patellar tubercle such as swimming and cycling. With the goal of improving knee functioning, stabilizing, and strengthening the core muscles is recommended [18,19]. The study [27] performed an additional exercises alongside the ESWT such as isometric exercise for Quadriceps and hamstrings, hip abductor dynamic strengthening exercise, free ROM exercise, and 15 minutes of hot pack. Further, participants were adviced to apply knee support while standing and walking and educated to perform the same exercises as home exercise program, as well as, they were adviced to avoid aggressive knee flexion such as cross sitting and squating. While the study [23] reported that the exercises were paused and the stress were reduced for several weeks and sport shoes inserts were applied.

As seen in [Table 3], the parameters [Working Pressure, Contact pressure, Pulses, and frequency] and the duration of device application was somewhat comparatively similar to each other in both studies. Regardless the model of the devices and the designs of the studies, both studies reported a significant improvement in OSD symptoms. Applying ESWT with similar parameters and duration might be possible to demonstrate the same effect for such cases.

The outcome measures used in the selected studies were reviwed. However, according the the results in the current review, the outcome measures used in the selected studies were valid and reliable outcome measures despite the excellence of the test-retest reliability of VAS. However, there was no evidence supports the psychometric properties of WOMAC for patients diagnosed with OSD. Also, VAS seems to be assessing patients who are older than 18 years old to confirm the validity. Regardless, it is not recommended to use VAS and WOMAC to measure the pain as WOMAC is an outcome measure designed to measure pain, stiffness and functional level.

The current review has some limitations. Due to the heteroginity of the selected studies, the meta-analysis was impossible to be conducted. Furthermore, the selected studies were published in 2012 and 2014, in which those studies seems to be conducted for more than 5 years ago. Recent evidevnce investigating the effectiveness of the intended intervetnion for the intended population is missed. According to our knowledge and the searching process that conducted, there was no recent evidence found that applied ESWT to treat OSD and its symptoms. Moreover, the participants in both studies to some extent were slightly few with a total number of 44 participants, 20 of them were control group and recived Interferential Current Therapy, which considered to be a very small sample size, the application of the same intervention for a bigger subject group might differ from the results found in the selected studies.

A considerable gap in the literature is noticed and need to be addressed. Therefore, conducting such studies with a bigger number of participants are necessary to be conducted to confirm the effectiveness of the intervention for the intended population. RCT design with blindging whether among the participants or the assessor is suggested.

Conclusion

Despite the lack of evidence investigating the effectiveness of ESWT on patinets diagnosed with OSD, applying the device demostrated a promising results to decrease the pain and to restore the functions; it is recommended to use the device in the clinics with the metioned parameters and durations. However, the lack of evidence prevents drawing firm conclusions, necessitating more studies to be conducted for a definite conclusion.

Acknowledgement:

The current study used the access of digital library of National Guard Hospital [NGH], King Saud bin Abdulaziz University for Health Science (KSAU), and King Abdulaziz University (KAU) to extract the data from the databases. Their support for easily accessing the databases is appreciated.

Ethical approval statement

Not applicable

Financial support and sponsorship

No financial support was received for this review.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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العلاج بالموجات الصادمة خارج الجسم للأطفال والمراهقين المصابين بمرض أوسغود شلاتر لتقليل آلام الركبة: مراجعة منهجية

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المستخلص:

المقدمة: يعتبر مرض التَّنَكُّسُ العَظْمِيُّ حالة شائعة تصيب مفصل الركبة لدى الأطفال والمراهقين الذين تتراوح أعمارهم بين 10 و 15 عامًا. يحدث هذا المرض بين 12.4 و 22.5 لكل 1000 من المراهقين الرياضيين. ينتج مرض التَّنَكُّسُ العَظْمِيُّ عن الإجهاد المتكرر في وتر الرضفة مثل الجري والقفز والجلوس القرفصاء؛ مما يسبب الألم والتورم في الدرنة الظنبوبية. قد يؤدي مرض التَّنَكُّسُ العَظْمِيُّ إلى عواقب طويلة الأمد مثل تقييد ثني الركبة، وتفتت وتنقل الشظية الظنبوبية، وتقوس الركبة، وارتفاع الرضفة. يمكن علاج التنكس العظمي غير المُعالَج جراحيًا. ومع ذلك، يمكن أن يكون العلاج بالموجات الصدمية خارج الجسم تدخلاً بديلاً لا يتطلب جراحة أو تلف الأنسجة.

الهدف: تهدف المراجعة المنهجية الحالية إلى التحقيق في فعالية العلاج بالموجات الصدمية خارج الجسم على الأطفال والمراهقين المصابين بمرض التَّنَكُّسُ العَظْمِيُّ لتقليل آلام ركبهم.

الطريقة: تم إجراء بحث إلكتروني عن الدراسات حول العلاج بالموجات الصدمية خارج الجسم على المرضى المصابين بالتَّنَكُّسِ العَظْمِيِ المنشورة باللغة الإنجليزية في قواعد بيانات مختلفة (PEDro, Scopus, MEDLINE, PubMed, CINAHL) تم استخدام أداة تقييم الجودة من المعهد الوطني للقلب والرئة والدم لتقييم الدراسات المشمولة.

النتائج: وفقًا لاستراتيجية البحث، من بين 2807 مقالة، تم اختيار دراستين فقط (دراسة المجموعة الضابطة العكسية والدراسة العشوائية ذات الشواهد) للمراجعة المنهجية الحالية، بمشاركة إجمالي 34 مشارك (20 ذكرًا و 14 أنثى) تم تشخيص إصابتهم بمرض التَّنَكُّسِ العَظْمِيِ. تراوحت أعمارهم بين 12 و 29 عامًا. جميع المشاركين يعانون من آلام ناتجة عن مرض التَّنَكُّسِ العَظْمِيِ.

الاستنتاج: تشير الأدلة المتاحة إلى وجود تأثير واعد لاستخدام العلاج بالموجات الصدمية خارج الجسم (ESWT) للمرضى المصابين بمرض التَّنَكُّسِ العَظْمِيِ لتقليل آلامهم. ومع ذلك، فإن قلة الأدلة تمنع استخلاص استنتاجات قاطعة، مما يستلزم إجراء المزيد من الدراسات للتوصل إلى استنتاج نهائي.

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Journal of Medical Rehabilitation Science, Volume 1. Issue 1, pp: 13 – 24 (2024)

Original Article

Preparedness and practice competency in Tracheostomy management by Speech language Pathologists in Saudi Arabia

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Abstract:

AIM: This study aimed to identify the preparations, clinical consistencies, management consensus and current practice patterns among the Speech language pathologists while treating tracheostomy patients with and without mechanical ventilator within the kingdom of Saudi Arabia.
METHODS: The questionnaire used by Ward et al., [2007, 2008 and 2012] and McGowan et al, [2014] in their respective studies was adapted for this study with approval from the authors. Thirty-eight Speech language pathologists working in Saudi Arabia responded to this survey and their responses were recorded.
RESULTS: Response analysis revealed low consensus in clinical practice patterns of the speaking valve fitting in ventilated patients, decision making of the type of tracheostomy tube and decannulation recommendations, whereas moderate consensus expressed in using speaking valve in tracheostomy patients without mechanical ventilator and dysphagia management in such patients.
CONCLUSION: The findings of this study warrant the need to establish an academic based training program, formal multidisciplinary team and clinical care pathway in respective institutions and hospitals for timely referral and managements of tracheostomy patients with and without mechanical ventilation. This study advocates the respective professional governing body to announce a position statement for managing tracheostomized patients and need for periodic training or continuing professional educations to enhance the preparedness of the Speech language pathologists in Saudi Arabia.

Keywords: Tracheostomy, Mechanical ventilation, Speech language pathology, Management consensus, Survey.

Submission: 04-12-2023
Accepted: 26-08-2024
Published: 01-09-2024

This article can be accessed online at: https://journals.kau.edu.sa/index.php/JRS/index
Doi: 10.4197/Mrs.1-1.3

Introduction

Tracheostomy is performed for airway maintenance, ventilation, in severe dysphagia patients for removal of secretions, or as an alternate airway. The presence of the tracheostomy tube in patients may be permanent or temporary. The presence of tracheostomy tube could lead itself to voice and swallowing problems. There is reportedly high incidence [50% to 87%] of aspiration in tracheostomized patients who pose potential risk of developing aspiration pneumonia [1]. Successful Tracheostomy weaning could be achieved by well-established stable respiratory status, achieving good oral secretion management and safe oral nutritional intake; Optimized verbal communication, educating the patient and the family members on the safe and hygienic

How to cite this article: Abdulsamadh S. and Aljabali M. Preparedness and practice competency in Tracheostomy management by Speech language Pathologists in Saudi Arabia. J Med Rehab Sci. 2024;1(1):13-24.

trach care in case patient required permanent tracheostomy tube. Optimized verbal communication, educating the patient and the family members on the safe and hygienic trach care in case patient required permanent tracheostomy tube. To summarize, successful tracheostomy weaning / management could be a result of well-defined efficient multidisciplinary team, well tested and established policies and procedure and it reflects on the training and the competencies of the team members.

The scope of practice by Speech language pathologists (SLPs) in tracheostomy management in-patient with or without mechanical ventilation is not only restricted to optimizing and managing communication and dysphagia. SLPs also participate in the decision-making and selection of tracheostomy tubes and course of achieving the milestones in weaning process [2, 3]. In the current context of medical rehabilitation, the tracheostomy patient loads dealt by the SLPs are becoming more complex and diverse [4] and their involvement on the tracheostomy weaning is considered as a key contribution in the critical care [5] and multidisciplinary tracheostomy team [6, 7].

Despite this expanding scope of practice and the role played by the SLPs in the tracheostomy management, less is known on what is being done throughout the SLPs academic and professional training in order to achieve quality practice standard and their competency. In addition, very less literature had been done focusing on the clinical consistency of the skills performed by the SLP on tracheostomized population. No validated information available on how they are practicing being a vital member of the tracheostomy weaning team.

From this survey, we reached out to the practicing SLPs working with the patients with tracheostomy tube in the Kingdom of Saudi Arabia and attempted to establish the clinical consensus towards their understanding of the scope of practice, practice patterns, their competency and method of training obtained.

Few such studies were done in the past aiming to investigate the clinical consistency and the service consensus by the SLPs working with tracheostomized patients in countries like Australia and United Kingdom (UK) [8, 9]. Study conducted among Australian SLPs, revealed that most of their clinical practice was in line with the published research evidenced and the practice guidelines prescribed by their national body governing the SLPs. However, there were also some aspects that showed practice inconsistencies among the SLPs, which was due to the limited evidences and/ or conflicting expert opinion. Another similar study was conducted examining the clinical patterns of the practicing SLPs in the UK [9]. They found that there was a moderate to high consistencies in various areas of practices among SLPs in UK in line with the literature evidence and national guidelines. The high consistencies were observed in the practice of assessment and management, Subjecting patients to instrumental assessment of swallowing, use of cuff deflation and reflation protocols and in the use of speaking valve.

The field of speech language pathology is relatively new to Saudi Arabia. The first Audiology and SLP program was established at King Saud University about 30 years ago. The Saudi Society of Speech-Language Pathology and Audiology [SSSPA] was officially established in 2003. As of 2018, in the Kingdome of Saudi Arabia, only 29 hospitals out of 196 hospitals that was surveyed render SLP services employing a total of 183 SLPs. Only, 20 hospitals provide voice and swallowing related services [10]. However, the number of SLPs practicing in the area of tracheostomy management was not ascertained.

This questionnaire-based survey was electronically distributed to the working SLPs in the hospitals in Saudi Arabia. The Questionnaire consists of different sections like participant demographics, their training and confidence levels in handling patients with tracheostomy, their clinical roles and responsibilities in their setting while handling tracheostomized patients, their skills and decision making in using speaking valve and dysphagia management. The questionnaire predominantly consists of closed choice rating like responses that could be used in analyzing the responding SLPs clinical consensus on the specific questions and this shall be represented in percentage.

This study aims to explore and identify the areas that required immediate attention in helping the speech language pathologists at various level of experiences to achieve the required competencies for treating patients with tracheostomy with or without ventilators. Hence, this study aims to identify the current pattern of practice by SLPs in treating adult patients with tracheostomy in the kingdom of Saudi Arabia.

Materials and Methods

This study involves online distribution (Google Forms) of the questionnaire to the SLPs working in the Kingdom of Saudi Arabia. The questionnaire was developed by Ward et al., [8, 11, 12] and used by McGowan et al, [9] for their study in UK SLTs from which this was adapted. Prior permission was sought through email from the authors. The survey questions would be adapted appropriately and distributed. The outcome of the survey response would be

analyzed for the presence of clinical skills consistency among the SLPs working with patients who are tracheostomized.

The questions in the survey were presented as closed choice questions either in either in a "Yes or No" or multi choice options or in a rating scales format. Some the questions, in addition to the above-mentioned form of responses, an option for open answer was given in case if the participant want to comment or describe their own answers or express their thoughts. In this investigation, the term 'tracheostomy management' [11] refers to the assessment and management of dysphagia [including decisions relating to decannulation], voice and communication.

The approval of this study was obtained from the department research approval committee and Ethical approval committee in Research affairs at King Faisal Specialist Hospital and Research Centre.

Subjects

This questionnaire was filled by the SLPs working in the Kingdom of Saudi Arabia with at least one year of working experience. They were expected to read the introduction part of the questionnaire in order to understand the purpose and the confidentiality agreement. In addition, by filling in the questionnaire, they consent us to publish the collective result in whatsoever purpose it was intended to. A total of thirty-eight respondents participated in the survey and were analyzed.

Results and Discussion

All the thirty – eight responses were analyzed. Table 1 lists the professional demographics of the respondents.

On an average, 15.8% respondents reported to have handled a caseload of more than 50 consisting of tracheostomy patients with and without mechanical ventilator, followed by 36.8% respondents had treated between 11-50 patients in a year.

Training, Preparedness and Confidence:

Based on the response provided, it seems that a significant proportion of the respondents had received some form of formal training or clinical supervision prior to managing patients with tracheostomy tubes. Around 21.1% and 31.6% had received formal training and clinical supervision of more than 20 hours. The courses that were listed by the respondents are mentioned in Table 2. However, it is concerned that a notable percentage of respondents reported receiving no formal training 10.5% or supervision 13.2%, which could indicate limited availability or poor awareness of such training programs or courses. It is important to note that managing patients with tracheostomy tubes requires specialized knowledge and skills, which can only be acquired through appropriate training and supervision. Lack of proper training and supervision can lead to poor quality service provided by the health care provider concerned, SLPs. It may be beneficial for healthcare organizations and institutions to review their policies and practices regarding the training and supervision of the SLPs who manage

Table 1: Demographic details of the participants

Demographic	Category	Number of respondents	Respondents in percentage
Gender	Male	6	15.8%
	Female	32	84.2%
Qualification	Bachelor's	18	47.4%
	Master's	17	44.7%
	Ph.D.	3	7.9%
Work experience	1-3 years	11	28.9%
	4-8 years	10	26.3%
	9-10 years	6	15.8%
	>10 years	11	28.9%
Working population	Pediatrics	7	18.4%
	Adults	9	23.7%
	Both	22	57.9%
Job setting	Acute care	26	68.4%
	Rehab	9	23.7%
	Private rehab	1	2.6%
	Educational facility	1	2.6%
	Acute & Rehab	1	2.6%

Table 2: Courses listed / attended by the responding SLPs

- Workshops arranged by SSSPA
- Non-SSSPA organized workshops
- Conference presentations
- Visited specialist Centre[s] where patients who are tracheostomized and ventilator assisted are treated by expert speech language therapists
- Simulation workshops, online webinars and recorded workshops
  - Passy Muire and ASHA websites
  - SNAP, MedSLP and ASHA CEUS
- Paid training in hospitals
- Through self-reading
- Part of formal education in graduate and Post graduate curriculum

patients with tracheostomy tubes. From the response provided, it appears that a majority of the respondents [60.5%] reported that their department or workplace does not have a formal competency training program in their work setting, which is concerning given the specialized knowledge and skills required for tracheostomy management by SLPs.

It is positive to note that 26.3% of the respondents reported that their workplace is currently developing a competency training program, and 13.2% reported that their workplace already has a tracheostomy competency program for SLPs. However, it is important to consider the method and mode of the competency training, as it can greatly impact the effectiveness of the program.

The fact that a majority of respondents [52.6%] expressed uncertainty about whether they are up-to-date with current evidence-based practices in tracheostomy management highlights the need for continuing professional education and skilled training courses in the region. It is crucial for healthcare professionals to stay up-to-date with the latest research and best practices in their field to ensure the best possible outcomes for their patients.

Overall, the lack of formal competency training programs and continuing education opportunities for healthcare professionals in tracheostomy management in the region is a concerning issue that needs to be addressed. It is important for healthcare organizations and institutions to prioritize the development and implementation of such programs to ensure the highest quality of care for patients.

The respondents emphasized the specific areas of training and support they feel would benefit their management of tracheostomy patients. The fact that a large majority of respondents expressed the need for specialized training or expert support in dysphagia management (76.3%) and speaking valve fitting (76.3% and 44.7%) highlights the importance of these areas in tracheostomy management. Additionally, the need for a standardized weaning protocol (60.5%) is also an important consideration, as it facilitates to provide systemic weaning approach which can greatly impact the success of the weaning process and patient outcomes. It is encouraging to see that the respondents recognize the importance of this aspect of tracheostomy management and feel that it is within the scope of practice for SLPs. The small number of respondents (2.6% each) who expressed the need for specialized training on cuff inflation and deflation, changing of inner cannula, subspecialty training of voice especially in pediatrics, and management of oral secretions in both pediatric and adult populations.

Overall, the specific areas of training and support identified by the respondents suggest that there is a need for specialized knowledge and skills in tracheostomy management beyond the basic competency level. It is important for healthcare organizations and institutions to prioritize the development and implementation of training programs and support systems that address these specific areas to ensure the highest quality of care for patients.

Literature also approves the requested service as most of the studies [11, 12] recommended that efforts need to be directed to providing more and varied types of advanced learning experiences for clinicians working in this field in order to ensure that there is an adequately trained clinical workforce. There are also strong recommendations stating that tracheostomy management should be well covered in the university programs as it is regarded as a practice that requires specialist skill level.

The collaborative team approach is crucial in the management of critical care patients [5], and SLPs are recognized as important team members in acute rehabilitation settings. However, the role of SLPs can vary between teams and wards, with critical care and ICUs supporting the role of SLPs more than other general wards. From the responses obtained, it is concerning to note that only 34.2% of the respondents reported having an optimal interdisciplinary team to work with tracheostomy patients, with 42.1% reporting that they are only sometimes a part of an optimal team. Additionally, a considerable 23.7% reported that there is no established team in their work setting.

The lack of an optimal interdisciplinary team can greatly impact patient outcomes. It is important for SLPs to be recognized as important team members in the management of tracheostomy patients and to be included in interdisciplinary teams to ensure the best possible outcomes for patients. Overall, the importance of interdisciplinary teams in the management of tracheostomy patients cannot be overstated, and healthcare organizations and institutions must work to establish and optimize these teams to ensure the highest quality of care for patients.

Various studies in the past discusses the challenges faced by speech and language pathologists (SLPs) in getting recognized as a team member in managing tracheostomy patients in critical care. This challenge seems to be a trend observed internationally and has been reported in various studies [11 , 13]. There are studies that highlights the benefits of a hospital-wide coordinated multidisciplinary team approach to tracheostomy management. Such an approach

can lead to better support for team members, reduced complications, more efficient achievement of goals, improved quality of care, and decreased time to decannulation and length of stay [14, 15, 16].

In terms of the role and support of speech and language pathologists (SLPs) in managing tracheostomy patients within a multidisciplinary team, a majority of the respondents [55.3%] reported having a defined role in an established multidisciplinary team working in tracheostomy patient management. However, 34.2% of the respondents reported that their role is only sometimes clearly defined and supported by other health professionals. Furthermore, 10.5% reported having no clearly defined role and not being involved in tracheostomy weaning/management.

Regarding the level of support received from the multidisciplinary team, the survey results showed that a majority of the respondents (63.2%) reported receiving expert clinical support from their team for managing patients with tracheostomy only. Additionally, 34.2% of the respondents reported receiving support for managing both tracheostomy patients with and without mechanical ventilator. Only one respondent (2.6%) reported receiving no support within the team.

Regarding the level of confidence reported by speech and language pathologists (SLPs) in managing tracheostomized patients, both with and without mechanical ventilation, within a multidisciplinary team. 60.5% of respondents reported that they feel confident in managing tracheostomized patients without mechanical ventilation, while only 15.8% reported feeling confident in managing tracheostomy patients with mechanical ventilation.

Additionally, 34.2% and 44.7% of respondents reported only sometimes they feel confident in managing tracheostomized patients without mechanical ventilation and with mechanical ventilation, respectively. There was a significant difference in lack of confidence expressed in managing patients only on tracheostomy tube (5.3%) compared to patient with tracheostomy with Mechanical ventilation (39.5%). The reason for the lower confidence level in managing tracheostomized patients with mechanical ventilator was due to the limited opportunities and limited training/supervision available to manage tracheostomized patients requiring ventilator assistance [11]. With the increased awareness regarding the role of SLPs in tracheostomy management among the health care providers, the SLPs' caseload of tracheostomy patients on mechanical ventilators is growing, which underscores the importance of a multidisciplinary team approach in managing these patients [15, 17]. From the responses, there is an explicit indication of the need for increased training and support for SLPs in managing tracheostomy patients, particularly those requiring mechanical ventilation, to ensure that they feel confident in their roles within a multidisciplinary team.

Clinical roles and responsibilities:

Based on the responses recorded by the SLPs, the primary reason for referral to speech language pathology services of patients with tracheostomy tube is for swallowing assessment to commence oral feeding which is closely followed by speaking valve fitting. However, relatively a very small number of respondents reported that they are involved in determining the suitability of the decannulation. Table 3 lists down the primary reason for referral to speech language pathology services of patients with tracheostomy tube as reported by the participating SLPs.

Table3: primary reason for referral to speech language pathology services of patients with tracheostomy tube

	Never	Seldom	Half the time	Usually	Always
	n (%)	n (%)	n (%)	n (%)	n (%)
Swallowing assessment to commence oral intake	2 (5)	2 (5)	1 (3)	12 (32)	21 (55)
Communication and speaking valve fitting	2 (5)	3 (8)	11 (29)	13 (34)	9 (24)
Determining suitability for decannulation	5 (13)	14 (37)	11 (29)	3 (8)	5 (13)

Based on the respondent's responses regarding the timing and appropriateness of referrals for speech and language pathologists (SLPs) in managing tracheostomy patients, a majority of participating SLPs reported that the timing of the majority of referrals was mostly appropriate and consistent (13.2% always appropriate and 44.7% mostly appropriate), while around 39.5% reported appropriate but inconsistent timing of referral. Regarding the fit of referred patients for SLP intervention, a total of 65.8% of respondents (31.6% reporting 76%-100% of referred patients and 34.2% reporting 51%-75% of referred patients) reported that the referred patients fit the criteria for SLP intervention. However, a significant proportion of respondents, 34.2%, reported that referred patients were not fit for SLP interventions. Despite the reported lack of fit for SLP interventions in some cases, a majority of respondents

(44.7% and 50%) reported that the trend of referral is either increasing or being constant, which may suggest an increasing recognition of the role of SLPs in managing tracheostomy patients. Similar findings of majority of the respondents reported timing of the patient referral was mostly to always consistent and appropriate [9]. However, most SLPs felt a considerable proportion of the patients with tracheostomy who would benefit from speech language therapy services were not being referred in their settings.

Based on the responses provided, it appears that there is variability in the degree of involvement of SLPs in the decision-making process for tracheostomy tube management and decannulation. There was low consensus among the responded SLPs (5.3% and 26.3% of the respondents) reported that they are either always or usually involved respectively in the decision making of the type and size of the tracheostomy tube during the weaning management. 34.2% reported that only half of the time they are involved in the decision making for such those events for tracheotomy management. This is significantly less than that of the findings from the similar study done among Australian SLPs [8], where they reported that 83.3% of the Australian SLPs who responded to the study, participate in decannulation decision-making processes. There was a moderate to high clinical consistency among the UK SLPs as they reported that they involve in participating in team decision making for suitability of decannulation [9]. SLPs in the United States are often consulted to determine if a patient is suitable for speaking valve trialing [5].

It is important to note that the scope of practice for SLPs may vary depending on the country and healthcare system in which they work. Irrespectively, it was well known that Speech language pathologists usually do not perform tracheal or oral suctioning and for that, they usually rely on the nurses or the respiratory therapists for the same. In recent times, in some settings, SLPs are trained to perform tracheal suctioning as part of their role in managing patients with tracheostomies. However, in intensive care units and / or for patients who are fragile or high risk, it may be necessary to rely on critical care experts like nurses and respiratory therapists to perform suction. There are reports of SLPs trained and performing tracheal suctioning in Australia [11] and in UK by [9].

Within Saudi Arabia, only a mere 13.2% respondents reported that they practicing suctioning on the patients during their management as approved by their work place and the rest of the respondents [86.8%] reported that suctioning is still not included their scope of practice. Of the 13.2% responding SLPs practicing suctioning; only a 7.9 % had formal training or underwent competency check for performing tracheal suctioning. A majority of 68.4% of the respondents in this current study expressed that they should be trained and allowed to perform tracheal and oral suctioning during their management in tracheostomy patients. This shows that there is a growing demand from SLPs to practice and perform oral and tracheal suctioning. Ultimately, the decision to include tracheal suctioning as part of the SLP scope of practice should be made based on careful consideration of the potential risks and benefits, as well as an assessment of the SLP's training and competency in this area.

Use of speaking valve:

The findings suggest that a majority of responded SLPs (81.6%) are aware of commercially available speaking valves that can be used on tracheostomy patients; 55.3% of the respondents recommended there is a need for further education and training on the evidence-based practices for managing tracheostomy patients with mechanical ventilation as they feel that they are not aware/up to date on the current evidence-based practice on managing tracheostomy patients with mechanical ventilation; It is concerning that almost half of the respondents feel that they are not up to date on the current evidence-based practice for managing tracheostomy patients with mechanical ventilation. This highlights the need for ongoing education and training in this area to ensure that SLPs are equipped with the knowledge and skills necessary to provide effective care for these patients.

Given that a majority of the respondents (97.4%) are aware of the clinical benefits of using speaking valves in tracheostomy patients, it is important to continue to promote the use of these devices in appropriate patients as part of comprehensive tracheostomy management.

Based on the responses, it appears that there is a significant knowledge gap among SLPs in terms of assessing the candidacy of patients with mechanical ventilation for speaking valve fitting and training, as well as trouble-shooting issues related to ventilator parameters. 65.8% respondents reported that they know how to assess the candidacy of the patient with mechanical ventilation for speaking valve fitting and training whereas a 34.2% of the respondents reported that they do not know how to assess.

It is crucial for SLPs to have a solid understanding of ventilator settings (52.6% respondent reported to be aware of different settings) and changes in mechanical ventilators' parameters, as well as the patient's respiratory physiology, in order to work effectively with tracheostomy patients who,

require mechanical ventilation. Moreover, collaboration with respiratory therapists is vital in trouble-shooting issues related to ventilator parameters and (A majority of 73.7% respondents do not know) recommending the necessary adjustments to ensure optimal patient outcomes.

It is important to note that the primary purpose of speaking valve fitting is to facilitate verbal communication for patients, regardless of whether they are on mechanical ventilation or not. The secondary benefits of speaking valve fitting for tracheostomy patients include improving swallowing abilities, enhancing oropharyngeal sensorium, and training patients to improve subglottal pressure essential for pharyngeal swallow and glottic closure. It is encouraging to see that a majority of the respondents (63.2%) reported that they know how to manage voice disorders in tracheostomized patients. However, it is crucial for SLPs to receive ongoing education and training to stay up-to-date with the latest research and best practices for working with this patient population.

Table 4 likely provides further details on the knowledge and preparedness of SLPs in dealing with tracheostomized patients with and without mechanical ventilators for speaking valve fitting and training.

There are different studies done in the past with results of some supporting and some refuting the benefits of speaking valve fitting for dysphagia management in tracheostomized patients. One such study was done using scintigraphy technique done on head and neck cancer patients with tracheostomies that all of the patients aspirated under the open tracheostomy tube and on the other hand, half of the patients' whose tracheostomy tube was occluded experienced no aspiration. Among the half that did aspirate under occluded tracheostomy tube, it was observed that the frequency and severity of the aspiration were reduced in all patients except for one [18].

A similar study using same technique with and without Passy Muire valve in place was done on 11 patients with known or suspected aspiration. The findings revealed that eight of 11 patients aspirated significantly less while wearing the valve while three of eleven saw no improvement. These findings suggest that a speaking valve may offer swallowing benefits to a majority of patients, but not all [19].

Later, a video fluoroscopy study done on 14 tracheostomy patients across the three conditions of cuff inflated, cuff deflated with open tube, and cuff deflated with speaking valve placed. No sPignificant differences were observed in the penetration-aspiration scale, irrespective the cuff was inflated or deflated. However, the ratings were significantly reduced with the speaking valve placement for thin liquid trials. Their findings indicate that a valve reduces

Table 4: SLPs Knowledge and Preparedness in dealing with tracheostomized patients with and without Mechanical Ventilators for speaking valve fitting and training.

	Response categories	
	Yes	No
Questions	n (%)	n (%)
Are you aware of the commercially available speaking valves to be used on patients with tracheostomy with and without ventilator assistance?	**31 (81.6)**	**7 (18.4)**
Are you aware of the current evidence-based procedures on speaking valve fitting on tracheostomy tubes without ventilator assistance?	**32 (84.2)**	**6 (15.8)**
Are you aware of the current evidence-based procedures on speaking valve fitting on tracheostomy tubes with ventilator assistance?	**17 (44.7)**	**21 (55.3)**
Are you aware of the clinical benefits of the use of speaking valve in tracheostomized patients with and without ventilator assistance?	**37 (97.4)**	**1 (2.6)**
Do you know how to assess the candidacy of the patients for speaking valve fitting and training in ventilated patients?	**25 (65.8)**	**13 (34.2)**
Are you aware of the ventilator modes that are favorable for the speaking valve fitting?	**20 (52.6)**	**18 (47.4)**
Do you know the various ventilator trouble shooting strategies that could help the patients to adapt speaking valves with ease?	**10 (26.3)**	**28 (73.7)**
Do you know how to manage voice disorders in tracheostomized patients?	**24 (63.2)**	**14 (36.8)**

but does not eliminate the frequency of aspiration and that the benefits of valve use vary among individual patients [20]. Some studies were unable to establish the benefits of speaking valve by investigating the effect of speaking valve on swallowing that is by reducing or eliminating aspiration and they found no differences in aspiration status across open and occluded conditions [21-24]. These findings do not indicate that the use of the one-way speaking valve improves swallowing function and may suggest that other biomechanics of swallowing should be considered.

Dysphagia Management:

Despite the fact that the modified Evan's Blue dye test has poor sensitivity and good specificity [25], there is a moderate level of clinical consensus among the responding SLPs (44.7% always use and 39.5% sometimes) stating that they use modified Evan's Blue dye swallowing test/ screening.

Mostly, the dysphagia management by the SLPs in tracheostomized patients with and without mechanical ventilator starts with dysphagia screening using Modified Evan's Blue dye test/screening which involves the SLPs presenting PO trials of different blue colored consistencies [one at a time of assessment) to the patient and performing tracheal suctioning (by the nurses or the respiratory therapists) to observed for any blue discoloration as a sign of aspiration. However, this method was currently not widely used due to the advancement of the options of objective swallowing assessment using video fluoroscopy (VFS/MBSS) Modified Barium swallow study and Flexible Endoscopic Evaluation of Swallowing (FEES). The criteria for objective swallowing assessment post blue dye screening were not discussed in this study. A majority of 73.7% of responding SLPs reported that they accept the referrals to commence dysphagia management in patients with tracheotomy tube who are on mechanical ventilators. However, a significant 26.3% reported that they do not accept tracheostomy patients with mechanical ventilation. Post swallowing screening, the preferred method of objective assessment was reported to be VFS/MBSS where 68.4% favored MBSS and 31.6% reported they prefer FEES. The reasons were not ascertained.

One of the most important points of discussion was whether the swallowing trials of food and fluids to be done with fully inflated cuff or not. A vast majority of the respondents 76.3% reported that they never conduct PO trials in fully inflated cuff of the tracheostomy tube. However, 23.7% reported that sometimes they do conduct PO trials with fully inflated cuff. It is noteworthy to highlight the findings of studies conducted on the impact of risk of aspiration during oral feeding with cuff inflated. There was a reporting of 2.7 times higher aspiration while feeding with inflated cuff (17.8% vs 6.5%) compared to deflated cuff. A retrospective analysis of 623 patients' video fluoroscopic study revealed that the frequency of reduced laryngeal elevation and silent aspiration were found to be significantly higher in the cuff-inflated condition as compared to the cuff-deflated condition [27].

Post Objective swallowing assessments, only less than half, 44.7% of the SLPs reported that their recommendations on food and fluid consistencies always strictly followed by the other medical staffs involved and a significant 44.7% of the SLPs reported that their recommendations are mostly followed. 10.5% reported that their recommendations are rarely followed by the other health care professionals in their settings. A survey in 2007, reported from their survey that RNs reported their compliance with SLPs' recommendations to be high. However, more than 80% of RNs requested for more education regarding dysphagia and reported that the time necessitated to feed individuals with dysphagia was the most common frustration [28]. Another survey focusing on nursing staff attitudes toward compliance with dysphagia management recommendations of the SLP revealed "hassle" (i.e., items related to the difficulty and extra work associated with SLP recommendations), the lack of knowledge of feeding techniques, and disagreement with SLP recommendations as the main factors of noncompliance with SLP recommendations [29]. On the contrary, study [28] revealed No association was found between the frustration and level of compliance.

Decannulation:

In order to achieve a successful decannulation with restored quality of life essential functions like communication and swallowing, the patient has to achieve the following objectives:

a. Cuff deflation tolerance
b. Tolerance of fenestrated tracheostomy tubes with downsizing if required
c. Speaking valve trials / training [restoring communication with near normal voice]
a. Dysphagia management
d. Tracheostomy capping / spigotting
e. Maintaining good aerodynamic readings in Physiologic testing [arterial blood gas]

There is a low consensus among the respondents that they are not usually involved in the decision making of

decannulation [only a total of 23.7% reported to be usually involved]. This information revealed that there is either no multidisciplinary team for managing tracheostomy patients or clear clinical work pathway for such patient population.

Decannulation must be done as fast and safely as possible should be the main focus of the medical and therapeutical staff in neurologic rehabilitation to build the basis for functional rehabilitation and independence [30].

This study shows that this is possible with an adequate amount of therapeutic intervention time when a multidisciplinary approach is followed consequently. 78.9% of the respondents reported that it is usually the respiratory therapists who initiates the cuff deflation for the tracheostomy patients in their work setting; this was followed by a significant 42.1% of respondents reported that SLPs are the one who initiates the cuff deflation trials in their setting. Others reported Primary nurse [7.9% respondents] and it is usually the interdisciplinary team which approaches for cuff deflation trials. Also, only a little less than 50% of the respondents reported that they are involved in cuff re-inflation either always (18.4%) or only half of the time (28.9%).

The following table 5 represents the number of responding SLPs involved in every objectives during the tracheostomy weaning process.

Table 5: SLPs involvement and / or participation in the process of systemic weaning of tracheostomy tube

	Never n (%)	Seldom n (%)	Half the time n (%)	Usually n (%)	Always n (%)
Cuff deflation trials	3 (7.9)	3 (7.9)	5 (13.2)	10 (26.3)	17 (44.7)
Selection of type of tubes	2 (5.3)	4 (0.5)	3 (7.9)	14 (36.8)	15 (39.5)
Speaking valve trials	2 (5.3)	4 (10.5)	8 (21.1)	10 (26.3)	14 (36.8)
Tracheostomy capping	6 (15.8)	3 (7.9)	4 (10.5)	9 (23.7)	16 (42.1)
ABG	6 (15.8)	9 (23.7)	9 (23.7)	6 (15.8)	8 (21.1)

Apart from responding to these closed choice questions, the respondents also expressed some comments and suggestions, which are as follows in their own words:

- An interprofessional knowledge/ education on ventilator setting adjustments has to be established between respiratory therapist and speech language pathologists
- needs a lot of education to the SLPs on tracheostomy management for patients with and without mechanical ventilators
- More education at the university level and training programs during internship/Saudi career development program (SCDP) years is needed
- need more hands-on courses and training program frequently to keep update with the current practice methods
- Need to establish a unified policy and procedures for better consistent service providing among the SLPs
- Patient with tracheostomy does not referred by doctors because of lack of their updated knowledge. Hence, patients are being referred very late most of the times.

Conclusion

Despite with the limited number of respondents, still it is concerning to hear about the lack of consensus among SLPs in clinical practice patterns for tracheostomy patients, particularly regarding speaking valve fitting and decision-making around tracheostomy tube type and decannulation. A multidisciplinary approach is important for the effective management of tracheostomy patients, and it is unfortunate that SLPs may not always be included in these teams due to unclear roles, perceived inexperience, and limited access to protocols and guidelines [31].

The observation of moderate consensus among SLPs regarding the use of speaking valves and dysphagia assessment and management in tracheostomy patients who were not on mechanical ventilation is encouraging. However, the lack of consensus on other aspects of care highlights the need for a formal multidisciplinary team and clinical care pathway to guide decision-making and ensure consistent, evidence-based care for tracheostomy patients. Developing an internal policy, training SLPs, and educating other healthcare providers can help ensure that all team members are on the same page and working towards a common goal. Ultimately, this can lead to safer weaning and shorter cannulation times [30, 32], which can improve patient outcomes and reduce healthcare costs. It is important for healthcare organizations to prioritize the development of such pathways and policies to ensure that tracheostomy patients receive the highest quality of care possible.

It is also important for the professional governing body to announce a position statement of SLPs managing tracheostomized patients with and without mechanical ventilators and ensure conducting periodic training or continuing professional educations to support the preparedness of the SLPs in the kingdom of Saudi Arabia to handle the discussed group of patients. There is a high

consensus from the responded SLPs emphasizing the need for the Hospital specific development and establishment of integrated clinical care pathway and disciplinary specific protocols for early successful weaning which could have an influence length of the hospital stay and quality of life.

The outcome of the survey emphasizes on the need for the professional governing body to provide guidance and support for SLPs managing tracheostomized patients with and without mechanical ventilators. A position statement and periodic training or continuing professional education can help ensure that SLPs in the kingdom of Saudi Arabia are prepared to handle these patients and provide high-quality care. It is also encouraging to hear that there is high consensus among the responded SLPs regarding the need for hospital-specific integrated clinical care pathways and disciplinary-specific protocols for early successful weaning.

Such pathways and protocols can have a positive impact on patient outcomes, including length of hospital stay and quality of life. By prioritizing the development and implementation of these pathways and protocols, healthcare organizations can improve the care of tracheostomy patients and ensure that SLPs and other healthcare professionals are working together to achieve the best possible outcomes.

Acknowledgement:

We thank and acknowledge the work of Elizabeth Ward and Susan McGowan for their permission to adapt and use their questionnaire used by them in their studies.

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Ethical approval statement

Not applicable

Financial support and sponsorship

Conflicts of interest

The authors report there are no competing interests to declare.

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الاستعداد والكفاءة العملية في إدارة القصبة الهوائية من قبل أخصائيي أمراض النطق واللغة في المملكة العربية السعودية

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العنوان: روضة الخزرج, حي المعذر, الرياض, المملكة العربية السعودية.

الرمز البريدي: 12721

المستخلص:

نطاق ممارسة أخصائي التخاطب واللغة في إدارة الانابيب الرغامية مع المرضى الذين يحتاجون او لا يحتاجون الى اجهزة التنفس الصناعي في توسع مستمر. وعلى الرغم من هذا التوسع, فقليل ما تم معرفته على ما تم عمله خلال مجال تحصص التخاطب واللغة من الناحيتين الأكاديمية والأكلينيكية بغرض تحقيق ممارسة وكفاءة بجودة عالية.

الدراسة تهدف الى تحديد الاستعدادات, الإتساقات السريرية وأنماط الممارسة الحالية بين أخصائي التخاطب والنطق خلال معالجة مرضى الأنابيب الرغامية مع أو بدون التنفس الصناعي في المملكة العربية السعودية. الأستبيان تم تعديله ليتناسب مع البيئة المختاره مع موافقة المؤلفون, Ward et al., (2007, 2008 and 2012) and McGowan et al, (2014). ثلاثة وثمانون أخصائي تخاطب ولغة يعملون في المملكة العربية السعودية استجابوا لهذا الاستطلاع.

النتائج أظهرت إجماع منخفض في أنماط الممارسة السريرية من تركيب صمام الكلام مع المرضى الذين يحتاجون الى تنفس صناعي، صناعة القرار فيما يخص نوع الأنبوب الرغامي وتوصيات إزالة الأنبوب الرغامي؛ بينما هنالك إجماع متوسط/معتدل فيما يخص استخدام صمام الكلام مع مرضى الأنابيب الرغامية بدون التنفس الصناعي وإدارة عسر البلع مع هؤلاء المرضى.

إن نتائج هذه الدراسة تتطلب الحاجة الى انشاء برنامج تدريب أكاديمي، فريق رسمي متعدد التخصصات ومسار للرعاية السريرية في المؤسسات المتقبلة والمستشفيات للإحالة والإدارة في الوقت المناسب لمرضى الأنابيب الرغامية مع أو بدون وجود التنفس الصناعي. هذه الدراسة تحض الهيئة المهنية المعنية بالأمر على إعلان بيان موقف لإدارة مرضى الأنابيب الرغامية والحاجة الى تدريب دوري أو تعليم محترف مستمر لتعزيز استعداد أخصائي النطق والتخاطب لإدارة مثل هذه الحالات.

Journal of Medical Rehabilitation Science, Volume 1. Issue 1, pp: 25 – 30 (2024)

Original Article

Impact of Weight Reduction on Glycemic Control and Glomerular Filtration Rate Among Patients with Type 2 Diabetic Nephropathy

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Abstract:

BACKGROUND: Diabetic nephropathy is a microvascular diabetic complication affecting about 40% of diabetic patients all over the world.
OBJECTIVE: This study aimed to measure oxidative stress, systemic inflammation and kidney function response to exercise training in type 2 diabetes mellitus (T2DM) nephropathy patients.
MATERIAL AND METHODS: Seventy patients T2DM (42 males and 28 females), body mass index (BMI) mean was 32.96 ± 3.25 Kg/m2and the mean of diabetes chronicity was 13.17 ± 2.18 year and enrolled two groups; group I: practiced aerobic exercise training & diet regimen) and group II: practiced no training or diet regimen intervention.
RESULTS: There were significant reduction in the mean values of body mass index (BMI), glycosylated hemoglobin (HBA1c), Homeostasis Model Assessment-Insulin Resistance Index) HOMA-IR) , insulin, estimated glomerular filtration rate (eGFR) and creatinine, in the other hand there were significant increase in the mean values of the quantitative insulin-sensitivity check index (QUICKI) in patients of group (A) as a result of weight reducing program, in the other hand the results of the control group (B) were not significant (P<0.05).
CONCLUSION: Weight reducing program modulated glycemic control and renal function of patients with type 2 diabetic nephropathy.
Keywords: Glomerular Filtration; Glycemic Control; Diabetic Nephropathy; Weight Reduction.

Submission: 04-12-2023
Accepted: 24-08-2024
Published: 01-09-2024

This article can be accessed online at: https://journals.kau.edu.sa/index.php/JRS/index
Doi: 10.4197/Mrs.1-1.4

Introduction

Diabetic nephropathy (DN) affecting about 40% of diabetic patients [1,2]. Moreover, DN is a microvascular diabetic complication lead to renal replacement [3,4], where abnormal metabolic control [5] usually associated with abnormal systemic inflammation and oxidative stress induce progressive kidney dysfunction among diabetics [6,7]. In a previous meta-analysis study that involved 13 previous study that included two previous randomized studies, they proved that non-operative weight reducing programs reduced blood pressure

How to cite this article: Abd El-Kader SM, AlKhateeb AM, Al-Fawaz SS, et al. Impact of weight reduction on glycemic control and glomerular filtration rate among patients with type 2 diabetic nephropathy. J Med Rehab Sci. 2024;1(1):25-30.

and proteinuria which indicated prevention of further kidney damage [8,9]. Lifestyle intervention modification is a recommended line of treatment for type 2 diabetes mellitus (T2DM) [10]. Therefore, this study wasdesigned to measure the impact of weight reduction on glycemic control and glomerular filtration rate among patients with type 2 diabetic nephropathy.

Materials and Methods

Subjects

Seventy patients T2DM (42 males and 28 females), body mass index (BMI) mean was 32.96 ± 3.25 Kg/m2 and the mean of diabetes chronicity was 13.17 ± 2.18 year and enrolled two groups; group I: practiced aerobic exercise training & diet regimen) and group II: practiced no training or diet regimen intervention. Patients with heart failure, renal failure, hepatitis, pregnant and smokers were excluded from participation in this study.

Measurements

Laboratory analysis

A. Glucose control: Serum glucose was measured with Hitachi 912 Chemistry Analyzer, while serum insulin was measured with cobas immunoassay analyzer (Roche Diagnostics). In addition, Homeostasis model assessment (HOMA-IR) was the formula used to assess insulin resistance [11, 12] and The quantitative insulin-sensitivity check index (QUICKI) was the formula used to assess insulin sensitivity [13].

B. Creatinine and estimated glomerular filtration rate measurements (eGFR): Serum level of creatinine was measured using Hitachi Modular (Roche Diagnostics, Mannheim, Germany). Moreover, the Statement of the Japan Nephrology Society (JNS) used to calculate eGFR [14,15].

Procedures

Participants randomly assigned in two equal groups:

1. Group (A): Participants practiced aerobic treadmill exercise training for 12 weeks of standard exercise training [16]. Every training session consisted of 5 minutes warm up, thirty minutes of 60-70% of maximum heart rate aerobic exercise training that followed by 10 minutes cooling down. Participants had three training sessions weekly for three months. Moreover, a dietician supervised participants following 1200 Kilocalories/day diet regimen for three months [17,18].

2. Group (B): received no clinical intervention.

Statistical analysis

Paired "t" test was used to compare between pre and posttest values. While the unpaired “t" test was used for comparing between both groups (P<0.05).

Results

Analysis of baseline characteristics proved that the two groups were homogenous (table 1). There were significant reduction in the mean values of body mass index (BMI), glycosylated hemoglobin (HBA1c), Homeostasis Model

Table (1): Analysis of Baseline data for all participants.

	Mean +SD		
	Group (A)	**Group (B)**	**Significance**
Age (year)	45.26 ± 7.11	47.18 ± 6.34	P >0.05
Gender (F/M)	21/14	22/13	P >0.05
Duration of diabetes (years)	14.22 ± 2.75	13.91 ± 2.68	P >0.05
BMI (kg/m^2)	35.25 ± 5.65	33.83 ± 5.41	P >0.05
Total cholesterol (mg/dl)	198.14 ± 17.32	192.26 ± 19.18	P >0.05
HDL-C (mg/dl)	33.85 ± 4.91	35.74 ± 4.22	P >0.05
LDL-C (mg/dl)	126.37 ± 12.13	123.81 ± 10.75	P >0.05
Triglycerides (mg/dl)	165.29 ± 15.46	161.97 ± 14.32	P >0.05
Body fat (%)	37.12 ± 3.84	35.43 ± 4.15	P >0.05
SBP (mmHg)	141.25 ± 13.47	143.76 ± 11.83	P >0.05
DBP (mmHg)	85.91 ± 6.54	84.22 ± 7.11	P >0.05

BMI: Body Mass Index; **SBP:** Systolic blood pressure; **DBP:** Diastolic blood pressure**; AST:** Aspartate aminotransferase; **ALT:** alanine aminotransferase; **AST/ALT:** Aspartate aminotransferase /alanine aminotransferase ratio; **HDL-c:** High-density lipoprotein cholesterol; LDL**-c:** Low density lipoprotein cholesterol.

Assessment-Insulin Resistance Index (HOMA-IR (, insulin, estimated glomerular filtration rate (eGFR) and creatinine, in the other hand there were significant increase in the mean values of the quantitative insulin-sensitivity check index (QUICKI) in patients of group (A) as a result of weight reducing program, however the results of the control group) were not significant (Table 2, a and b respectively). In addition, there were significant differences between both groups at the end of the study (Table 3) (P<0.05).

Table 2: Analysis of BMI, creatinine, eGFR, HBA1c, Insulin, QUICKI and HOMA-IR in group (A) before and after the study.

	Mean + SD		t- value	Significance
	Before	After		
a) Group (A)				
BMI (kg/m^2)	35.25 ± 5.65	28.63 ± 4.72*	8.14	P <0.05
Creatinine (µmol/mol)	86.64 ± 9.29	73.12 ± 7.41*	9.21	P <0.05
eGFR (mL/min/1.73(m^2)	65.23 ± 7.16	52.81±6.24	7.15	P <0.05
HBA1c (%)	8.62 ± 1.78*	6.73 ± 1.55	6.36	P <0.05
Insulin (mU/l)	15.76 ± 2.84	11.58 ± 2.41*	5.61	P <0.05
QUICKI	0.125 ± 0.016	0.171 ± 0.026*	5.13	P <0.05
HOMA-IR	6.14 ± 1.21	4.11 ± 0.98*	5.52	P <0.05
b) Group (B)				
BMI (kg/m^2)	33.83 ± 5.41	31.45 ± 4.57	2.31	P > 0.05
Creatinine (µmol/mol)	84.72 ± 7.85	85.53 ± 7.96	1.56	P >0.05
eGFR (mL/min/1.73(m^2)	63.54 ± 6.23	65.21 ± 6.45	1.47	P >0.05
HBA1c (%)	7.91 ± 1.43*	6.25 ± 1.64	1.13	P >0.05
Insulin (mU/l)	15.54 ± 2.67	15.92 ± 2.83	1.26	P > 0.05
QUICKI	0.131 ± 0.024	0.125 ± 0.019	0.63	P > 0.05
HOMA-IR	6.59 ± 1.17	6.17 ± 1.26	0.98	P > 0.05

BMI: Body Mass Index; **eGFR** : estimated glomerular filtration rate; **HBA1c:** glycosylated hemoglobin; **QUICKI:** The quantitative insulin-sensitivity check index; **HOMA-IR**: Homeostasis Model Assessment-Insulin Resistance Index; **(*)** indicates a significant difference, P < 0.05.

Table 3: Analysis of BMI, creatinine, eGFR, HBA1c, Insulin, QUICKI and HOMA-IR in group (A) and group (B) before and after the study.

	Mean + SD		t- value	Significance
	Group (A)	Group (B)		
BMI (kg/m^2)	28.63 ± 4.72*	31.45 ± 4.57	4.52	P <0.05
Creatinine (µmol/mol)	73.12 ± 7.41*	85.53 ± 7.96	6.14	P <0.05
eGFR (mL/min/1.73(m^2)	52.81±6.24	65.21 ± 6.45	5.23	P <0.05
HBA1c (%)	6.73 ± 1.55	6.25 ± 1.64	4.27	P <0.05
Insulin (mU/l)	11.58 ± 2.41*	15.92 ± 2.83	3.64	P <0.05
QUICKI	0.171 ± 0.026*	0.125 ± 0.019	4.21	P <0.05
HOMA-IR	4.11 ± 0.98*	6.17 ± 1.26	4.16	P <0.05

BMI: Body Mass Index; **eGFR** : estimated glomerular filtration rate; **HBA1c:** glycosylated hemoglobin; **QUICKI:** The quantitative insulin-sensitivity check index; **HOMA-IR**: Homeostasis Model Assessment-Insulin Resistance Index; **(*)** indicates a significant difference, P < 0.05.

Discussion

Type 2 diabetes and obesity impair kidney function [19,20]. There are many risk factors for DN includes abnormal glycemic control, diabetes chronicity and life style [21]. Therefore, this study was designed to measure the influence of weight loss on glycemic control and glomerular filtration rate among patients with T2DM nephropathy. However, the principle finding of this study was that weight loss associated with modulated kidney function and glycemic control among T2DM with DN; these findings agreed with many previous trails.

Concerning renal function, our results proved the benefits of weight loss on serum creatinine and estimated glomerular filtration rate. These findings lined with Giordani et al. enrolled observed significant correlation between the increase in GFR and glucose control among 14 obese patients with T2DM after a 7-day very low-calorie diet (VLCD) [22] and Jesudason et al. randomly assigned seventy-six obese patients with T2DM to either a moderate-protein weight-loss diet or a standard-protein weight-loss diet for 12 months and found that Weight loss improved renal function [23]. However, Saiki and colleagues proved that weight reduction using 4-week low-calorie diet improved renal function and proteinuria in obese patients with diabetic nephropathy [24]. While Motie and coworkers proved that intentional weight loss resulted in no significant reduction in serum creatinine and glomerular filtration rate (GFR) after 3-month intensive behavioral weight management intervention among fifty overweight and obese patients with heart failure [25]. In addition, He and coworkers proved that GFR was negatively correlated with BMI among Chinese subjects that means that maintaining healthy level of BMI prevent renal damage [26]. Moreover, Zhiqing and colleauges reported that rats with streptozotocin (STZ)-induced diabetes experienced improved kidney function as a result of operative weight reduction with duodeno-jejunal bypass (DJB) [27].

Regarding glycemic control, our results proved that weight loss associated with improved insulin sensitivity. These findings lined with Angelico et al. stated that modest weight loss led to improved insulin resistance among metabolic syndrome patients [28], Similarly, Bacchi et al. proved that nonalcoholic fatty liver patients with T2DM experienced improved insulin sensitivety following 4 months of exercise training [29]. However, Look AHEAD Research Group reported that behavioral weight loss interventions modulated HbA1c, and systolic blood pressure among patients with T2DM [30]. Moreover, Chertow and colleagues reported that weight loss associated with improved metabolic control and renal function of obese T2DM with renal insufficiency [31].

Conclusion

Weight reducing program modulated glycemic control and renal function of patients with type 2 diabetic nephropathy.

Ethical approval statement

This study was approved by the Ethical Committee for Scientific Research, Faculty of Applied Medical Sciences, King Abdulaziz University.

Financial support and sponsorship

This study was conducted without external financial support.

Conflicts of interest

There are no conflicts of interest.

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تأثير إنقاص الوزن على التحكم في نسبة السكر في الدم ومعدل الترشيح الكلوي للكرياتينين بين المرضى الذين يعانون من اعتلال الكلية السكري من النوع الثاني

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مستخلص

الخلفية: يعتبر اعتلال الكلية السكري هو أحد مضاعفات مرض السكري الوعائية الدقيقة التي تؤثر على حوالي 40٪ من مرضى السكري في جميع أنحاء العالم.

الهدف: تهدف هذه الدراسة إلى قياس الإجهاد التأكسدي والالتهاب الجهازي واستجابة وظائف الكلى لممارسة التدريب على مرضى اعتلال الكلية من داء السكري النوع الثاني.

المواد والطرق: سبعون مريضا من داء السكري النوع الثاني ، وكان متوسط مؤشر كتلة الجسم 3.25 ± 32.96 كجم/متر مربع وكان متوسط مزمن مرض السكري 13.17 ± 2.18 سنة وسجلت مجموعتين. المجموعة الأولى: ممارسة التدريب على التمارين الهوائية ونظام النظام الغذائي والمجموعة الثانية: لم تمارس أي تدريب أو تدخل في نظام غذائي

النتائج: كان هناك انخفاض معنوي في القيم المتوسطة لمؤشر كتلة الجسم ، ومستوي السكر الهيموجلوبين ، تقييم نموذج التوازن – مؤشر مقاومة الأنسولين في الدم ، نسبة الأنسولين في الدم ، معدل الترشيح الكلوي للكرياتينين، من ناحية أخرى كانت هناك زيادة معنوية في القيم المتوسطة لمؤشر فحص حساسية الأنسولين الكمي في مرضى المجموعة الأولي نتيجة لبرنامج إنقاص الوزن، من ناحية أخرى، لم تكن نتائج المجموعة الثانية الضابطة ذات دلالة.

الخلاصة: يساعد برنامج تخفيض الوزن في التحكم بمستوي السكر في الدم ووظائف الكلى للمرضى الذين يعانون من اعتلال الكلية السكري من النوع الثاني.

الكلمات الدالة: معدل الترشيح الكلوي للكرياتينين ; التحكم في نسبة السكر في الدم ; اعتلال الكلي السكري; تخفيض الوزن; داء السكري النوع الثاني.

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Journal of Medical Rehabilitation Science, Volume 1. Issue 1, pp: 31 – 39 (2024)

Original Article

Prevalence and Risk Factors of Work-Related Musculoskeletal Disorders among occupational versus physical therapists in Saudi Arabia

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Submission: 24-06-2024
Accepted: 15-07-2024
Published: 01-09-2024

This article can be accessed online at:
https://journals.kau.edu.sa/index.php/JRS/index
Doi: 10.4197/Mrs.1-1.5

Abstract:

BACKGROUND: Work-Related Musculoskeletal Disorders (WRMSD) is considered one of the worldwide major problems across the health care system and It affects the productivity, quality of work and the employee's daily life activities.
OBJECTIVE: This study was designed to estimate the prevalence and associated factors of WRMSD among occupational therapists versus physical therapists in Saudi Arabia.
MATERIALS and METHODS: A cross-sectional study in which an online questionnaire was circulated through social media applications to target occupational and physical therapist in Saudi Arabia only 363 subjects completed the questionnaire. The questionnaire consisted of three sections [1] an introduction to explain the study goals; [2] questions about demographic information such as gender, years of experience, the highest educational degree completed, work setting, and specialty; [3] questions about the anatomic distribution of musculoskeletal injuries, potential risk factors, and coping responses to injuries.
RESULTS: There was a high prevalence of WRMSD among 363 occupational and physical therapists who completed the survey. The most affected regions were knees (92.6%) followed by lower back area (72.7%), neck (54.5%), upper back area (41%) and shoulder (38%).The most commonly associated job risk factor for WRMSD is working in awkward positions such as bending knees of flexing back (71.3%) followed by dealing with heavy patients (60.6%). In addition, there was no significant difference between occupational and physical therapists regarding prevalence and risk factors of work-related musculoskeletal disorders ($P<0.05$).
CONCLUSION: The WRMSD are common among occupational and physical therapists in Saudi Arabia. The most common risk factors were working in awkward positions such as bending knees of flexing back followed by dealing with heavy patients. There is a need to develop ergonomics training programs and effective interventions to overcome WRMSD and improve working environment among occupational and physical therapist

Keywords:

Work Related Musculoskeletal Disorders; Pain; Occupational Therapy; Physical Therapy.

How to cite this article: Abd El-Kader SM, Qawagzah SM, Alsulimani I, et. al. Prevalence and Risk Factors of Work-Related Musculoskeletal Disorders among occupational versus physical therapists in Saudi Arabia. J Med Rehab Sci. 2024;1(1):31-39.

Introduction

Work-Related Musculoskeletal Disorders (WRMSD) are regarded as one of the biggest issues facing the medical community globally. It has an impact on the worker's everyday activities, productivity, and quality of work. It also raises the financial burden of treating these injuries [1,2]. The WRMSD includes a "wide range of inflammatory and degenerative diseases and disorders that result in pain and functional impairment," according to the World Health Organization. They mainly appear when individuals are exposed to work-related activities and circumstances that, in addition to other variables, greatly encourage the development of WRMSD symptoms or worsen them [3,4].

The majority of WRMSD develops over time, where many variables often interact to create musculoskeletal problems rather than a single cause. Many of the physical causes and risk factors of work-related motion sickness (WRMSD) include handling loads while bending and twisting, dynamic or repetitive movements, static and bad postures, shaking movements, inadequate lighting or cold work environments, and working quickly and for extended periods of time while sitting or standing in the same posture, according to the European Agency for Safety and Health (EU-OSHA) [5].

Occupational injuries are prevalent among healthcare professionals [6]. Occupational therapists [7] and Physical therapists (PTs) in specific are routinely exposed to work-related physically demanding tasks such as handling patients, applying manual techniques and assuming sustained improper positions, which may lead to the development of WRMSD [8]. This subsequently may reduce therapists' quality of life [9] as well as increase the economic cost associated with treating such injuries [10].

For the best of our knowledge, limited studies available about WRMSD and musculoskeletal disorders among occupational therapists, therefore the present study was the first study was the first trail to compare the risk WRMSD among occupational and physical therapists. Therefore, this study was designed to find out the prevalence and possible associated factors of WRMSD among occupational therapists versus physical therapists in Saudi Arabia.

Materials and Methods

This is a cross-sectional survey study. The study was approved and conducted in accordance to the guidelines of the Ethics committee of the Faculty of Medical Rehabilitation Sciences; Jeddah; Saudi Arabia.

Recruitment method

Invitations were sent to Saudi occupational and physical therapists with a standard message to motivate therapists to participate in the survey. Further, the online questionnaire was distributed by using a google form link. In addition, therapists from different governorates were contacted directly and were invited to participate.

Eligibility criteria

Male and female therapists were eligible to participate if they fulfilled the following inclusion criteria: (1) licensed to work in Saudi, and (2) have at least one year of experience. Participants were excluded if they were occupational and physical therapy students and intern or other healthcare professionals, or had an experience of less than one year after graduation.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Shapiro-Wilk test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation, and median. Descriptive statistics was used to express the prevalence of WRMSD, risk factors, and coping responses. Chi-square test was used to examine the association between the highest prevalent WRMSD and demographic variables. Moreover, Mann Whitney test was used for abnormally distributed quantitative variables in order to compare between the two studied groups ($P<0.05$).

Results

Demographic data

More than half of participants are males (50.1%) and 49.9% are males with male to female ration is 1.01: 1. The mean age of participants ranged between 22 years to 48 years with mean of 27.61± 5.84 years. The mean weight, height and BMI in our studied participants are 69.43± 18.13 Kg, 166.25± 9.35 cm and 24.69± 5.09 Kg/m^2 respectively. More than half of them (59.8%) are from Jeddah followed by Riyadh (13.8%) then Makkah (8.3%). Right hand is the dominant hand in most participants (85.4%).

Table 1: Demographic and baseline characteristics of studied participants.

Items	Studied participants (n= 363)	
	No	%
Gender		
Male	182	50.1%
Female	181	49.9%
Age (years)		
Mean± SD	27.61± 5.84	
Range	22- 48	
Weight (Kg)		
Mean± SD	69.43± 18.13	
Range	40- 120	
Height (cm)		
Mean± SD	166.25± 9.35	
Range	150- 190	
BMI (Kg/m^2)		
Mean± SD	24.69± 5.09	
Range	16.02- 39.18	
City		
Jeddah	217	59.8%
Riyadh	50	13.8%
Makkah	30	8.3%
Madinah	22	6.1%
Taif	11	3.0%
Yanbu	11	3.0%
Al Rass	6	1.7%
Tabuk	6	1.7%
Jazan	5	1.4%
Abha	5	1.4%
Dominant Hand		
Right	310	85.4%
Left	48	13.2%
Ambidextrous	5	1.4%
Physical Activity		
Highly Active	49	13.5%
Active (Moderate)	190	52.3%
Light Active (Sedentary)	124	34.2%
The highest obtained education qualification		
Bachelor	295	81.3%
Diploma	5	1.4%
Master	47	12.9%
Doctorate	16	4.4%
Years of Experience		
1-5 years	252	69.4%
6-10 years	43	11.8%
11-15 years	42	11.6%
16 -20 years	15	4.1%
Above 20 years	11	3.0%
Specialty:		
Physical therapist	167	46.0%
Occupational therapist	196	54.0%
Type of work facility		
Public Hospital	159	43.8%
Private facility	147	40.5%
Both	57	15.7%

According to physical activity, 52.3% participants reported moderate activity, 34.2% of them are less active and 13.5% are highly active. Regarding education qualification, the majority (81.3%) had Bachelor's degree, 1.4% of them had diploma degree, 12.9% of them had master degree and 4.4% of them had doctorate degree. Concerning years of experience, 69.4% participants had 1-5 years' experience, 11.8% of them had 6-10 years' experience, 11.6% of them had 11-15 years' experience, 4.1% of them had 16 -20 years' experience and 3% of them had above 20 years' experience. More than half participants (54%) are occupational therapist, while 46% of them are physical therapists (Table 1).

The most commonly associated environmental/job risk factor for work related musculoskeletal disorders is working in awkward positions such as bending knees of flexing back (71.3%) followed by dealing with heavy patients (60.6%) then incorrectly using your body mechanics (53.2%) and taking stationary positions for a long time & having to move patients passively (51.5%). Other factors are illustrated in (Table 2).

Table 2: Job risk factors contributing to work-related pain among the studied participants.

	participants (n= 363)	
	No.	%
3. What are the routinely occupational tasks that may cause your pain? (You may choose all that applies)		
Working in awkward positions such as bending knees of flexing back	259	71.3%
Dealing with heavy patients	220	60.6%
Incorrectly using your body mechanics	193	53.2%
Taking stationary positions for a long time	187	51.5%
Having to move patients passively	187	51.5%
Lake of sufficient resting time between cases	176	48.5%
Repeating the same treatment technique	171	47.1%
Repeated bending and twisting	171	47.1%
Examining and treating lots of patients daily	160	44.1%
Continue work despite injury or pain	138	38.0%
Working beyond your physical abilities	121	33.3%
Having to save falling patients	116	32.0%
Working area is very narrow and wouldn't allow me to work without adding physical stress	94	25.9%
Lack of receiving proper training to accommodate your body mechanics with work demands	94	25.9%
Using ergonomically improper tools	61	16.8%

Affected body parts with work-related pain

The knees are the most commonly affected body area (92.6%) followed by lower back area (72.7%) then neck (54.5%), upper back area (41%), shoulder (38%), hands (33.3%), thumbs (30.3%), hips (9.1%), ankles (7.7%) as well as elbows (4.7%) (Table 3).

Table 3: Affected body parts with work-related pain among the studied participants.

	participants (n= 363)	
	No	%
In the last 12 months, which of the following regions do you feel pain as a result of manual work:		
Knees	336	92.6%
Lower back area	264	72.7%
Neck	198	54.5%
Upper back area	149	41.0%
Shoulder	138	38.0%
Hands	121	33.3%
Thumbs	110	30.3%
Hips	33	9.1%
Ankles	28	7.7%
Elbows	17	4.7%

Strategies and altered work habits to reduce body strain

The most commonly used strategy by the studied participants to reduce body strain & pain was adjusting the patient's or physician's position (33.3%) followed by performing warms up or exercise regularly (22.9%), taking regular breaks or at fatigue (21.2%), seeking help of a physiotherapist or requesting help from a colleague for handling the case (7.7%) and using a splint or Kinesio taping or adjusting the plinth height (6.1%) (Table 4&5). Occupational & physical therapists had significant different gender, age, weight, height, city, dominant hand, physical therapy, educational level and years of experience.

Regarding the comparison between occupational & physical therapists regarding affected body parts, there is no significant difference between occupational & physical therapists regarding affected body part (Table 6). Comparison between occupational & physical therapists regarding symptoms revealed there is no significant difference (Table 7).

Table 4: Strategies and altered work habits that the studied participants to reduce body strain.

	participants (n= 363)	
	No	%
How do you handle your symptoms from your occupational tasks?		
Adjust the patient's position or mine	121	33.3%
Perform warms up or exercise regularly	83	22.9%
Take regular breaks or at fatigue	77	21.2%
Seek help of a physiotherapist	28	7.7%
Request help from a colleague for handling the case	28	7.7%
Use a splint or Kinesio taping	22	6.1%
Adjust the plinth height	22	6.1%

Table 6: Comparison between occupational & physical therapists regarding affected body parts.

		Occupational therapist (n=196)		Physical therapist (n=167)		Test value	P-value
		n	%	n	%		
In the last 12 months, which of the following regions do you feel pain as a result of manual work	Knees	175	89.3%	161	96.4%	X^2= 6.86	0.651 (NS)
	Lower back area	126	64.3%	138	82.6%		
	Neck	98	50.0%	100	59.9%		
	Upper back area	80	40.8%	69	41.3%		
	Shoulder	68	34.7%	70	41.9%		
	Hands	61	31.1%	60	35.9%		
	Thumbs	60	30.6%	50	29.9%		
	Hips	20	10.2%	13	7.8%		
	Ankles	10	5.1%	18	10.8%		
	Elbows	10	5.1%	7	4.2%		

P value >0.05: Not significant (NS), P value <0.05 is statistically significant (S), p<0.01 is highly significant (HS) , X^2:Chi- Square test

Table (5): Comparison between occupational & physical therapists regarding participants' baseline data.

		Occupational therapist (n=196)		Physical therapist (n=167)		Test value	P-value
		n	%	n	%		
Gender:	**Male**	66	33.7%	116	69.5%	X^2= 46.20	**<0.001 (HS)**
	Female	130	66.3%	51	30.5%		
Age (years), median (IQR)		25 (23- 27)		30 (24- 35)		Z_{MWU}= 5.89	**<0.001 (HS)**
Weight (Kg) , median (IQR)		62 (50- 83.5)		72 (58- 85)		Z_{MWU}= 3.94	**<0.001 (HS)**
Height (cm) , median (IQR)		162 (157- 171)		170 (163- 175)		Z_{MWU}= 5.67	**<0.001 (HS)**
BMI (Kg/m2) , median (IQR)		22.22 (20.28- 28.14)		23.78 (22.48- 27.68)		Z_{MWU}= 1.95	0.052 (NS)
City	**Jeddah**	111	84.2%	116	87.5%	X^2= 82.95	**<0.001 (HS)**
	Riyadh	44	22.4%	6	3.6%		
	Makkah	12	6.1%	18	10.8%		
	Madinah	12	6.1%	10	6.0%		
	Taif	0	0.0%	11	6.6%		
	Yanbu	0	0.0%	11	6.6%		
	Al Rass	6	3.1%	0	0.0%		
	Tabuk	6	3.1%	0	0.0%		
	Abha	5	2.6%	0	0.0%		
	Jazan	23	10.4%	2	6.3%		
Dominant Hand	**Right**	164	83.7%	146	87.4%	X^2= 9.12	**0.010 (HS)**
	Left	32	16.3%	16	9.6%		
	Ambidextrous	0	0.0%	5	3.0%		
Physical Activity	**Highly Active**	16	8.2%	33	19.8%	X^2= 31.67	**<0.001 (HS)**
	Active (Moderate)	89	45.4%	101	60.5%		
	Light Active (Sedentary)	91	46.4%	33	19.8%		
The highest obtained education qualification	**Bachelor**	179	91.3%	116	69.5%	X^2= 44.74	**<0.001 (HS)**
	Diploma	0	0.0%	5	3.0%		
	Master	6	3.1%	41	24.6%		
	Doctorate	11	5.6%	5	3.0%		
Years of Experience	**1-5 years**	169	86.2%	83	49.7%	X^2= 81.6	**<0.001 (HS)**
	6-10 years	11	5.6%	32	19.2%		
	11-15 years	0	0.0%	42	25.1%		
	16 -20 years	10	5.1%	5	3.0%		
	Above 20 years	6	3.1%	5	3.0%		
Type of work facility	**Public Hospital**	87	44.4%	72	43.1%	X^2= 2.083	0.353 (NS)
	Private facility	74	37.8%	73	43.7%		
	Both	35	17.9%	22	13.2%		

Table 7: Comparison between occupational & physical therapists regarding symptoms.

		Occupational therapist (n=196)		Physical therapist (n=167)		Test value	P-value
		n	%	n	%		
Symptoms	Pain	153	78.1%	139	83.2%	X^2= 7.42	0.060 (NS)
	Weakness	84	42.9%	43	25.7%		
	Stiffness	38	19.4%	34	20.4%		
	Heaviness	20	10.2%	13	7.8%		

P value >0.05: Not significant (NS), P value <0.05 is statistically significant (S), p<0.01 is highly significant (HS), X^2: Chi- Square test

Discussion

The findings of the present study proved that the prevalence of the WRMSD among Saudi occupational and physical therapists is high, the most common anatomical sites are the knees followed by lower back area then neck, upper back area, shoulder, hands. The most common occupational tasks that may lead to WRMSD were working in awkward positions such as bending knees of flexing back followed by dealing with heavy patients then incorrectly using body mechanics. Therapists mostly handle their symptoms by modifying the working position of the therapist or the patient, performing warms up or exercise regularly, taking regular breaks or at fatigue or asking for help from other therapists.

The prevalence rates of WRMSD are usually high among most of physiotherapists around the world. Similarly, occupational therapists are at risk of work-related injuries because of the demanding nature of their work, therefore occupational and physical therapists face similar and significant risks of injury and WRMSD [7]. However, information about work-related injuries and musculoskeletal disorders among occupational therapists is limited, this study designed to measure the prevalence and risk factors of WRMSD among occupational versus physical therapists in Saudi Arabia as well as the most adapted coping strategies.

Although limited previous studies analyzed WRMSD among occupational therapist, there were many previous studies have been conducted on physical therapists regarding WRMSD. The findings of this present study agreed with many previous studies which showed that pain is the most common symptom in five body areas included lower back, knees, shoulder, and neck [11-15].

We found that the five most affected body areas with WRMSD were knee, lower back, neck, upper back and shoulders, this order was different in many previous studies that reported that WRMSDs was higher in lower back, shoulders and neck than upper back knee [13, 14,16 and 17]. Also, a study was conducted in Bangladesh, showed that the most painful areas were the lower back, upper back, and neck [18]. Moreover, a study was conducted on occupational therapists in Northern Europe reported that the most area they complained was the neck. Similarly, several studies reported that occupational and physical therapists felt numbness and pain in the shoulder and lower back areas. The reason for this contradict with our findings that reported that the most commonly affected areas with WRMSD were knee, lower back, neck, upper back and shoulders may be due to the differences in the commonly used techniques of manual therapy used by the occupational and physical therapists in Saudi Arabia and northern Europe [19-23].

Moreover, a study was conducted among Greek physiotherapist, workers in the private sector are most affected by WRMSD [5]. While in our research it appeared that the percentages are similar to each other in both the government and private sectors. While, according to our results, repeated bending and twisting and working in awkward positions were the most common occupational tasks that may cause pain, these results agreed with many previous studies [1,5,14,17]. On the other hand, Alnaser and Aljadi,2019 reported that manual therapy techniques and transferring a patient were the top two risk factors [11]. However, adjust of the position of the patient or the position of the therapist was the most common strategy used to handle the symptoms according to the results of the present study which agreed with Kakaraparthi et al, 2021 [13].

The nature of using an online-based survey is the major limitation of this study. It was impossible to control who could access this study. However, before accessing the survey, a brief statement was written indicating that this survey was developed only for licensed occupational and physical therapists who are working in Saudi Arabia and are actively treating patients participated in this study. In addition, the small sample size may limit generalization of results. Moreover, this study used self-reported data, so there was possibility that the participants tended to over or underestimate their response. However, further trail is required to assess the association between work related musculoskeletal disorder and the psychosocial factors of the occupational and physical therapists.

Conclusion

The results of this study reveal that the prevalence of WRMSD among occupational and physical therapists in Saudi Arabia was high. The most affected body region was

the knee, followed by low back then neck, upper back area and shoulder. The most common risk factors were working in awkward positions such as bending knees of flexing back.

The most common coping strategies were adjusting patient's or therapist's body position and giving up the technique for a less painful one. These findings call for the need to develop ergonomics training programs and effective interventions and modifications to overcome WRMSD and improve working environment among therapists in Saudi Arabia.

Acknowledgement:

Authors are grateful for the cooperation and support of all subjects who participated in this study.

Ethical approval statement

This study was approved by the Ethical Committee for Scientific Research, Faculty of Applied Medical Sciences, King Abdulaziz University.

Financial support and sponsorship

This study was conducted without external financial support.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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انتشار وعوامل خطر الاضطرابات العضلية الهيكلية المرتبطة بالعمل بين المعالجين المهنيين مقابل المعالجين الفيزيائيين في المملكة العربية السعودية

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المستخلص:

الخلفية: تعتبرالاضطرابات العضلية الهيكلية المرتبطة بالعمل إحدي المشاكل الرئيسية في جميع أنحاء العالم عبر نظام الرعاية الصحية وتؤثر على الإنتاجية وجودة العمل وأنشطة الحياة اليومية للموظف. الهدف: تم تصميم هذه الدراسة لتقدير مدى انتشار تعتبرالاضطرابات العضلية الهيكلية المرتبطة بالعمل والعوامل المرتبطة به بين المعالجين المهنيين مقابل المعالجين الفيزيائيين في المملكة العربية السعودية. **المواد والأساليب:** دراسة مقطعية تم فيها تداول استبيان عبر الإنترنت عبر تطبيقات وسائل التواصل الاجتماعي لاستهداف أخصائي العلاج الوظيفي والفيزيائي في المملكة العربية السعودية أكمل الاستبيان 363 شخصا فقط. تألف الاستبيان من ثلاثة أقسام (1) مقدمة لشرح أهداف الدراسة. (2) أسئلة حول المعلومات الديموغرافية مثل الجنس ، وسنوات الخبرة ، وأعلى درجة تعليمية مكتملة ، وبيئة العمل ، والتخصص ؛ (3) أسئلة حول التوزيع التشريحي للإصابات العضلية الهيكلية ، وعوامل الخطر المحتملة ، واستجابات التأقلم مع الإصابات.

النتائج: كان هناك انتشار كبير للاضطرابات العضلية الهيكلية المرتبطة بالعمل بين 363 من المعالجين المهنيين والفيزيائيين الذين أكملوا المسح. وكانت المناطق الأكثر تضررا هي الركبتين (92.6٪) تليها منطقة أسفل الظهر (72.7٪) والرقبة (54.5٪) ومنطقة الظهر العليا (41٪) والكتف (38٪). عامل الخطر الوظيفي الأكثر شيوعا هو العمل في أوضاع محرجة مثل ثني الركبتين من ثني الظهر (71.3٪) يليه التعامل مع المرضى الثقيلين (60.6٪). بالإضافة إلى ذلك ، لم يكن هناك فرق كبير بين المعالجين المهنيين والفيزيائيين فيما يتعلق بانتشاروعوامل الخطر للاضطرابات العضلية الهيكلية المرتبطة بالعمل.

الخلاصة: تعتبرالاضطرابات العضلية الهيكلية المرتبطة بالعمل شائعة بين المعالجين المهنيين والفيزيائيين في المملكة العربية السعودية. كانت عوامل الخطر الأكثر شيوعا هي العمل في أوضاع محرجة مثل ثني الركبتين من ثني الظهر متبوعا بالتعامل مع المرضى البدناء. هناك حاجة لتطوير برامج التدريب على بيئة العمل وتحسين بيئة العمل بين المعالجين المهنيين والفيزيائيين.

الكلمات الدالة: الاضطرابات العضلية الهيكلية المرتبطة بالعمل; الألم; العلاج الوظيفي; العلاج الطبيعي.

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