

Musculoskeletal Impairments and Dysfunction in Patients with Head and Neck Cancer Following Surgery with Neck Dissection. A Systematic Review

Norazlin Mohamad^{1,2}; Ana Izabela Sobral de Oliveira-Souza³; Stephanie M. Ntoukas⁴; Ester Moreira de Castro-Carletti³; Munayati Munajat⁵; Liz Dennett⁶; Kerry S. Courneya⁴; Susan Armijo-Olivo^{1,3*}; Margaret L. McNeely^{1*}

1Faculty of Rehabilitation Medicine, Physical Therapy Department, University of Alberta, Canada ; 2 Centre of Physiotherapy, Universiti Teknologi MARA, Puncak Alam Campus, Selangor, Malaysia ; 3 University of Applied Sciences, Faculty of Business and Social Sciences, Osnabrück – German ; 4 Faculty of Kinesiology, Sport, and Recreation. The University of Alberta, Canada ; 5 Department of Physical Rehabilitation Sciences, Kulliyyah of Allied Health Sciences, IIUM Kuantan Campus, Malaysia ; 6 Geoffrey and Robyn Sperber Health Sciences Library, University of Alberta, Edmonton, Canada.

BACKGROUND

- Head and neck cancers (HNC) originate in the oral cavity, nasal cavity, sinuses, lips, mouth, salivary glands, throat, or larynx
- Individuals with HNCs are often treated with surgery, with or without post-operative radiation therapy or chemoradiotherapy.
- Various forms of HNC surgery, including neck dissection, have been shown to negatively impact basic functioning, appearance, and psychosocial and psychological well-being of this patient population

Purpose

- The primary objective of this systematic review was to identify, summarize, and appraise the quality of existing research evidence examining neuromusculoskeletal impairments experienced by individuals with head and neck cancer (HNC) following different types of cancer surgery.

METHODS

INCLUSION CRITERIA

- Studies with individuals diagnosed with various types of HNC
- HNC surgeries that included a neck dissection
- Studies with any outcome measures related to neuromusculoskeletal impairments and dysfunction
- RCT , cohort studies and cross-sectional studies

EXCLUSION CRITERIA

- Studies that not directly relevant to intervention and outcome of interest
- This systematic review was registered in PROSPERO (CRD42020210544) and reported based on PRISMA guidelines



DATABASES

Ovid MEDLINE(R), Embase (OVID interface), CINAHL, and SCOPUS



KEYWORDS

Head and neck cancer * Neck surgeries * Neck dissection * Neuromusculoskeletal impairments *



QUALITY OF ASSESSMENT TOOLS

- Risk of Bias Tool (RoB2)
- ROBIN-I tool



DATA SYNTHESIS

The findings were synthesized narratively based on :

- Neuromusculoskeletal impairments and outcome (e.g., pain intensity, range of motion (jaw, shoulder, and neck), muscle strength and disability .
- Types of neck surgeries (e.g., radical neck dissection, modified radical neck dissection, selective neck dissection)

FINDINGS

Figure 1 : PRISMA FLOWCHART

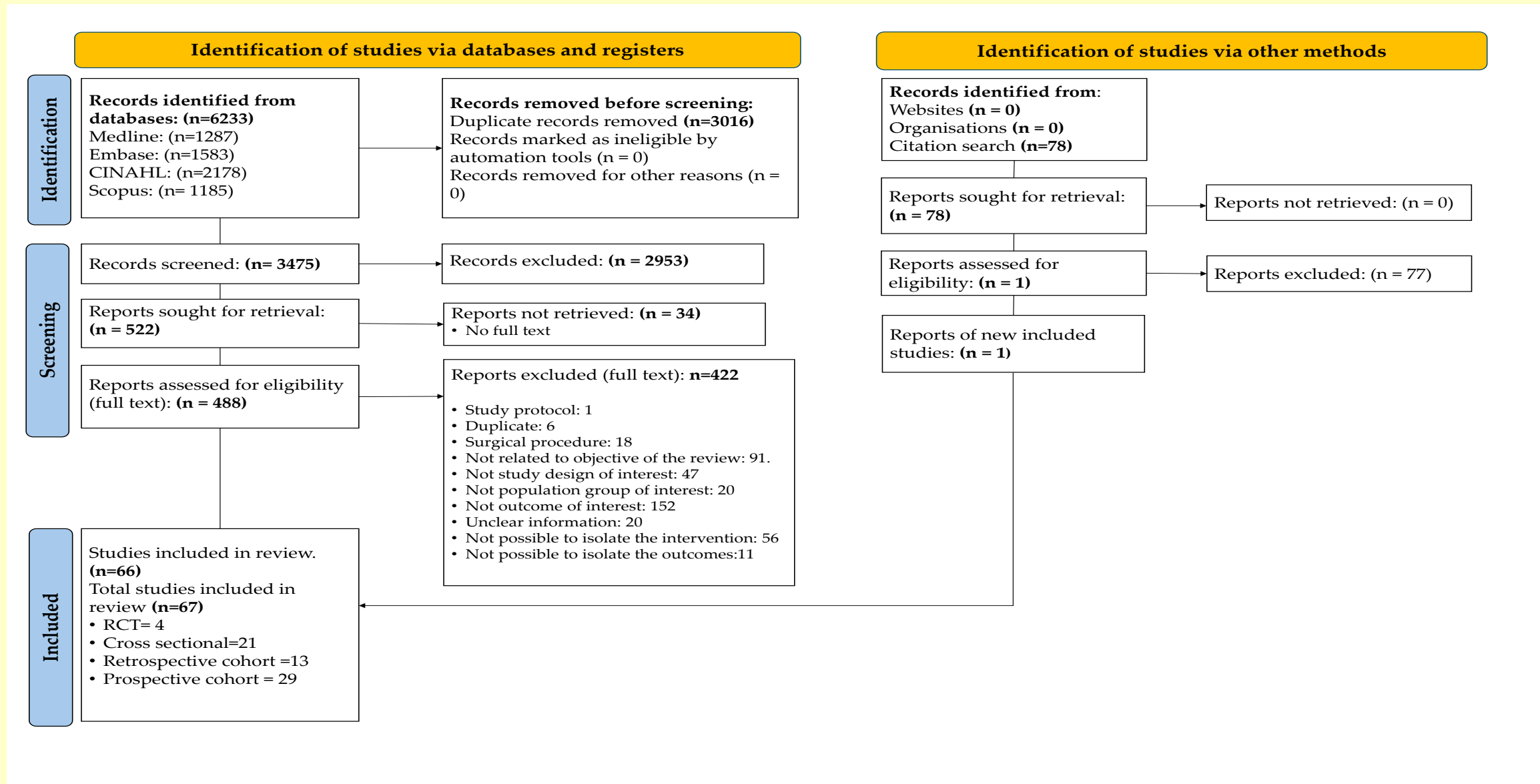


Figure 2: Reported study details from included studies

HNC DIAGNOSIS

- Mixed HNC (N=44)
- Oral , Tongue and Oropharynx (N=14)
- Larynx (N=4)
- Nasopharyngeal (N=1)
- Not reported (N=4)

TYPES OF ND

- Radical Neck Dissection (RND)Modified Radical Neck Dissection (MRND)
- Selective Neck Dissection (SND)
- Elective / Functional Neck Dissection (END/FND)
- Mixed Neck Dissection (preserved/removed Cervical nerve root)
- SND/MRND with Reconstruction

NEUROMUSCULOSKELETAL IMPAIRMENTS

- Pain**
Shoulder (N=11/67)
Neck (N=5/67)
Myofascial muscle pain (N=1/67)
- Range of Motion Deficits**
Shoulder Joint (N=26/67)
Cervical Joint (N=9/67)
Jaw (N=1/67)
- Strength Deficits**
Shoulder Muscles (N=10/67)
Neck Muscles (N=2/67)
Respiratory Muscles (N=1/67)
- Muscle Activation Dysfunction**
Trapezius Muscle (N=6/67)
Sternocleidomastoid (SCM) (N=2/67)
- Muscle volume loss**
Trapezius (N=1/67)
- Functional Disability**
Shoulder disability (N=32/67)
Shoulder and neck disability (N=5/67)
Neck disability (N=3/67)
- Other**
Posture (N=1/67)

QUALITY OF ASSESSMENT

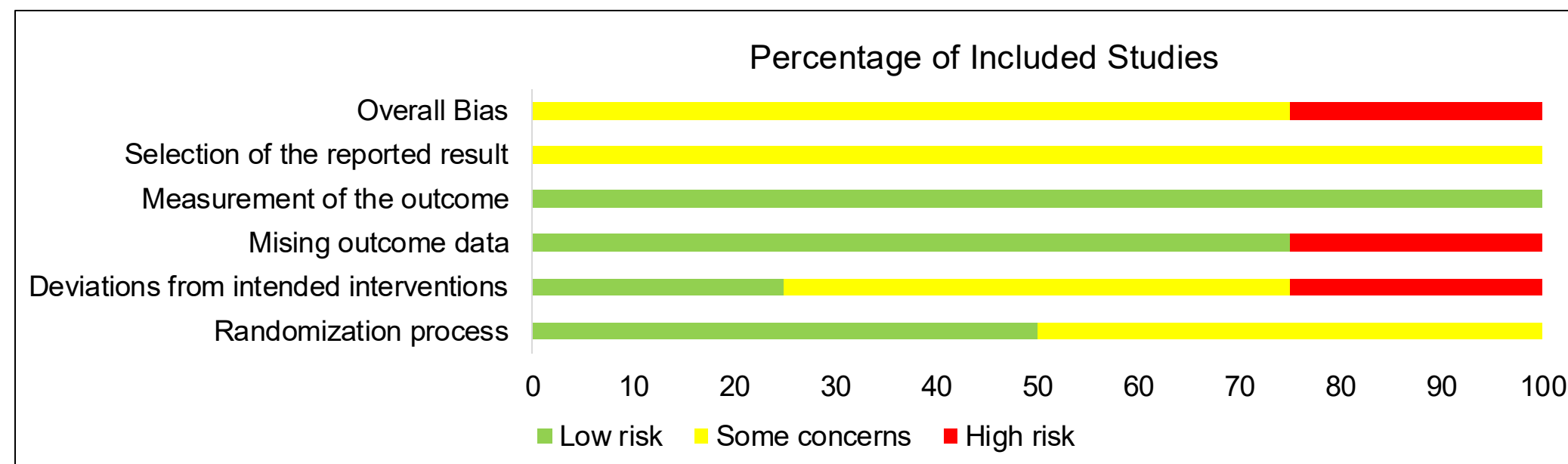


Figure 2 : Cochrane Risk of Bias assessment across the studies for RCT studies

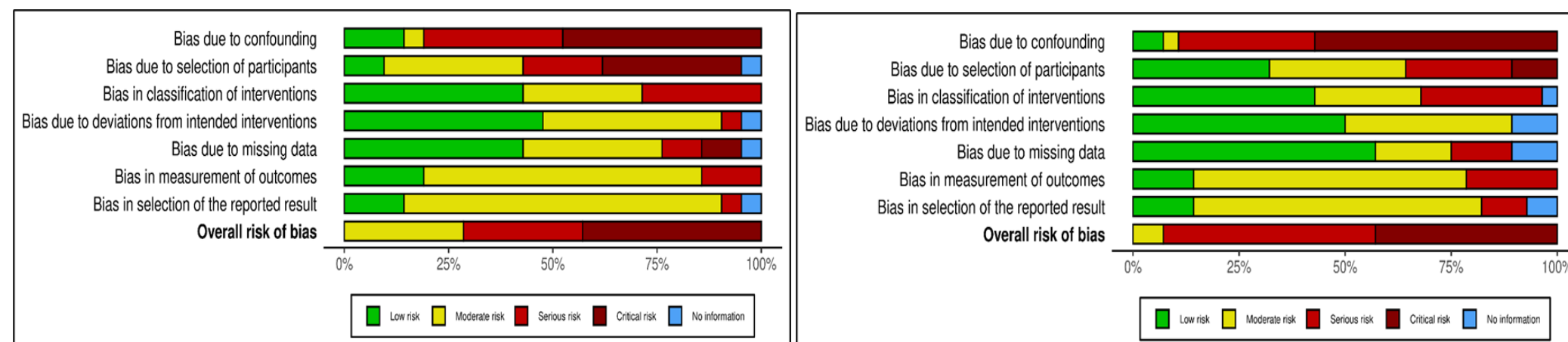


Figure 3 (A): ROBINS-I assessment: Cross Sectional Studies

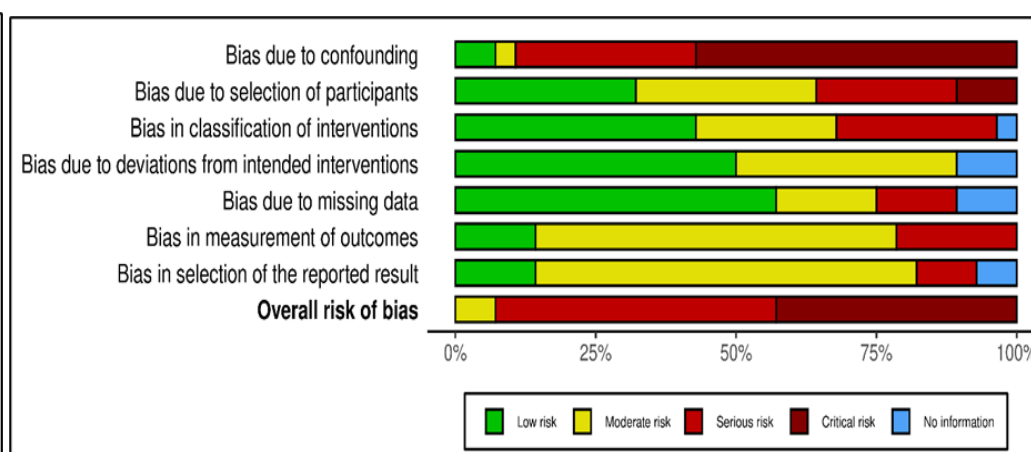


Figure 3 (B): ROBINS-I assessment Prospective Studies

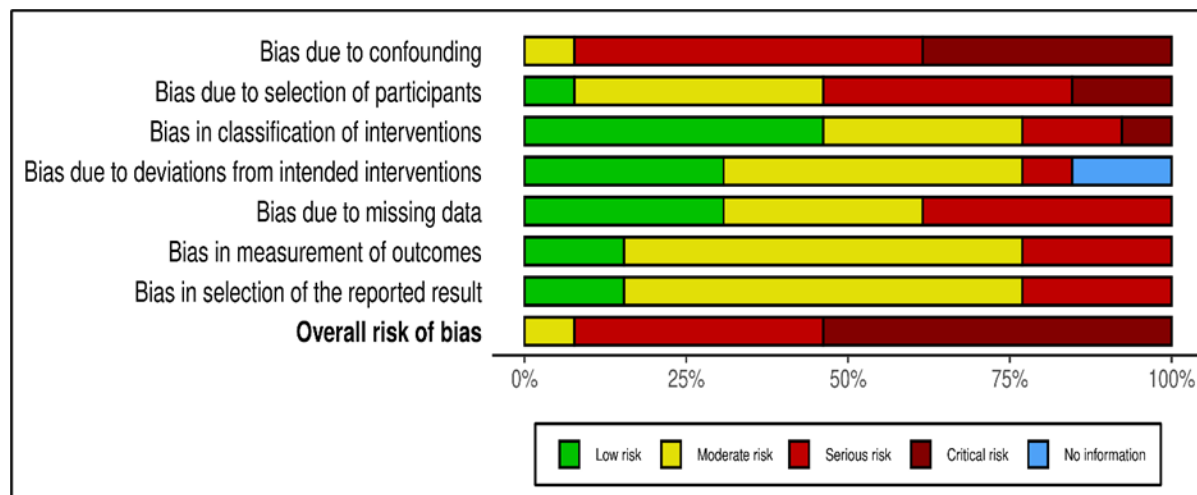


Figure 3 (C): ROBINS-I assessment Retrospective Studies

CONCLUSION

- A wide range of study designs have been used to examine neuromusculoskeletal impairments following neck dissection procedures involving individuals with varied HNC diagnoses.
- Impairments reported across studies included outcomes related (1) pain, (2) deficits in range of motion, (3) muscle strength, size and neuromuscular activation, and (4) region-specific functional disability.
- Overall studies were found to be moderate to critical risk of bias.

CLINICAL AND RESEARCH IMPLICATIONS

- A significant evidence gap was identified regarding the methodological quality of studies.
- As patients may experience one or more impairments, there is a need for agreement on a core outcome set to facilitate the collection of data to better characterize impairments across multiple upper body region.
- Findings highlight the need for developing specialized pre- and post-operative rehabilitation programs for individuals with head and neck cancer to address the potential negative consequences resulting from neck dissection procedures.

