ABSTRACT. Objective: This study aimed to adapt a pre-existing cross-country comparison (CCC) model to Occupational Health Physiotherapy (OHP) practice as a basis for locating and examining contextual factors that may influence OHP practice in Japan and Australia. Method: A secondary analysis was conducted of existing publicly-available data on OHP and related influential factors, following the five components of the CCC model: work-related legislation; labor market characteristics; culture; physiotherapy practice norms; and organization of OHP practice. Results: Legislation in both countries promotes safe work and rehabilitation of work injured/ill workers. 2019 unemployment was lower in Japan with higher employment protection than Australia. Both countries have an ageing workforce and rising retirement age. Cultural differences relate to higher long-term orientation and uncertainty avoidance in Japan. Australia has higher individualism and physiotherapists are autonomous practitioners with direct access, which differs from Japan. Both countries have a national OHP subgroup, to date only Australia has OHP professional practice standards. Discussion: This study is the first to compare OHP practice in Japan and Australia. Contextual similarities and differences observed may underpin OHP practitioner role and its enhancement in work-related musculoskeletal disorder prevention and management strategies, the return-to-work process, and development of this physiotherapy discipline nationally. Conclusion: Adapting the CCC model to OHP practice enabled a structured exploration of resources and data, from which to extract and compare contextual factors that may shape OHP practice in Japan and Australia. This in turn may provide a useful springboard for further discussion about OHP practice internationally. Key words: Occupational health and safety, Physiotherapy practice, Cross-country comparison model
healthy workforce, particularly in relation to work-related musculoskeletal disorders (WRMSDs)\(^6\). However, how physiotherapists operate in the field of occupational health and safety (OHS) may vary between countries, and investigating work-related physiotherapy practices may be the first step toward understanding similarities and differences in their role\(^6\). To date, there is no established “road map” of how best to make international comparisons of specific fields within occupational health physiotherapy (OHP)\(^6\).

World Physiotherapy is the international body for physiotherapists; it has more than 120 member organizations and regularly conducts surveys to determine the “global state of the physiotherapy profession”\(^8\). World Physiotherapy divides their member organizations into five geographical regions\(^9\). The World Physiotherapy Asia Western Pacific region has member organizations in 30 countries including Japan and Australia\(^10\) which are the focus of the current paper. Their World Physiotherapy member organizations are the Japanese Physical Therapy Association (JPTA) and the Australian Physiotherapy Association (APA)\(^10\). World Physiotherapy has formal subgroups for specific areas of practice that promote the advancement of physiotherapy and the exchange of scientific knowledge in their field\(^11\). The International Federation of Physical Therapists working in Occupational Health and Ergonomics (IFPTOHE) is a World Physiotherapy subgroup established in 2019\(^11\). Both the Japanese Society of Physical Therapy Section on Occupational Health (JSPTSOH) and Occupational Health Physiotherapy Australia (OHPA) are IFPTOHE member organisations\(^11\). Although these countries lie in the same World Physiotherapy region, they differ in both land mass and population size: while considerably smaller in size, Japan has a much larger population than Australia (approximately 126 and 25 million people respectively)\(^22\). Both countries have an ageing population and consequently an ageing workforce\(^13\). High numbers of WRMSDs occur in both countries\(^14,17\), with physiotherapists as stakeholders involved in their management. However, the similarities and differences in their work systems and customs related to OHP remain unexplored.

A cross-country comparison (CCC) model was developed by de Rijk\(^14,19\) to enhance comparisons of factors influencing work disability prevention practices with the aim of learning about and from each other. In the same spirit, and with a view of strengthening knowledge about OHP practice, it seems appropriate to determine contextual influences that may underpin the similarities and differences of OHP practice in Japan and Australia. The objectives of the current paper were: to adapt the existing CCC model components to OHP; locate resources and data to satisfy the model’s components; and to use them to describe/compare contextual factors in Japan and Australia that may influence OHP practice.

### Methods

#### Study design

This study involved a secondary analysis of existing publicly-available data on OHP and related influential factors. As it did not involve human subjects, Human Research Ethics approval was not required. To direct the method of sourcing information, the authors used the framework of a cross-country comparison model (CCC model)\(^18,19\) based on new institutional theory\(^20\). Although the model was designed for a different aspect of occupational health practice, it has recently provided a useful structure for the comparison of OHP practices between countries\(^6\). The model invites examination of five components: 1) Work-related legislation, 2) Labor market characteristics, 3) Culture, 4) Physiotherapy practice norms, and 5) Organization of OHP practice. Figure 1 shows the adaptation of the CCC model used for this study. Information retrieval was performed between March 2020 - April 2021.

#### Work-related Legislation

The authors defined “work-related legislation” as the formal societal rules and regulations of work and the workplace (for example, Acts) and the principles therein that relate to OHS and injury/illness management. We obtained the information related to this component of the model from the national work safety authorities’ relevant web sites\(^21-23\). The authors also searched these websites for any guidelines about preventing and managing WRMSDs set by those authorities.

#### Labor market characteristics

Three labor market characteristics were compared: unemployment rate, employment protection level, and trend for retirement age. Unemployment rate reflects the underutilization of labour supply; we used the International Labour Organisation definition of unemployment which includes three criteria (not employed, looking, available)\(^24\). Employment protection level (2019) was examined in relation to the strictness of regulation about individual dismissals of regular workers, it provides an indication of job security with numbers ranging from 0-6, where the higher the figure the higher the social protection\(^25\). Information about national retirement age (2021 and future) was sourced from the Finnish Centre for Pensions\(^26\).

#### Culture

Culture is defined as the collective ideas, customs, and behaviors of a certain group of people\(^27\). In his work on international business culture, Hofstede considered six dimensions: power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence. A brief definition of each of these terms is appended (Appendix 1). To determine the differences and similarities be-
between the Japanese and Australian cultures, we used the Hofstede’s-insights comparison tool\(^{26}\). This scores different countries on each of the six dimensions using a numerical system (0-100), where a high score reflects a strong dimension. Prior physiotherapy researchers have also gained national perspectives using Hofstede’s dimensions of culture\(^{16,20,29}\).

**Physiotherapy practice norms**

The authors considered ‘Norms’ as the national conditions and parameters that guide physiotherapy professional practice. To determine these, we appraised several factors using data about national group profiles from the World Physiotherapy website (2020)\(^ {30}\). This information included: demographics (number of physiotherapists in the national association group, practitioner/population ratio, and gender balance); minimum qualification required to practice (Degree or Diploma); nature of accreditation/registration; autonomy of practitioners and patient’s direct access. We sought national guidelines related to WRMSDs prevention and management from medical and occupational health authorities and from the physiotherapy profession. Additionally we sought a description of the physiotherapy services currently provided to injured/ill workers including return to work services; seeking in Japan from the Ministry of Health, Labour and Welfare website\(^ {31}\), Japan Industrial Safety and Health Association\(^ {32}\), Work Australia has practical guidance material to help employers prevent and manage WRMSDS more broadly\(^ {40}\).

**Organization of OHP practice**

OHP practice involves “a range of measures aimed at reducing health and safety risks for people at work through injury [and illness] prevention and management”\(^ {15}\). To determine the organization of OHP practice we compared the activities of the national OHP subgroups in each country: JSPTSOH and OHPA. Using World Physiotherapy, JPTA and APA websites, we gathered information on the date of subgroup formation in each country and where required contacted the national association directly (eg. for current subgroup membership data). We determined whether there were OHP professional practice standards\(^ {33,34}\) and whether there was guidance material to support practitioners about evidence based return to work practices. Finally, we sought to determine how physiotherapy students learn about OHP practice. To do this we compared the undergraduate curriculum (Bachelor degree program) at one university in each country, selected for convenience. These were the Kansai University of Welfare Sciences\(^ {35}\) and the University of South Australia\(^ {36}\) because the authors’ affiliation with these institutions permitted access to internal program documents.

**Findings**

**Work-related legislation**

Both countries have legislation aimed at securing the safety and health of workers in workplaces and facilitating a positive work environment. In Japan, the Industrial Safety and Health Act\(^ {37}\) is the principal work legislation which together with the Labor Standards Act (Act No. 49 of 1947)\(^ {38}\) optimize national health and safety. In Australia there is similar legislation which is state based and nationally harmonized (eg South Australia has the Work Health and Safety Act, 2012)\(^ {39}\). Australia also has state-based legislation regarding the management of injured/ill workers (including treatment); the over-arching aim is for Australian employers, where possible, to accommodate work injured/ill workers in terms of hours and duties and to facilitate a safe and durable return to work (eg South Australia has the Return to Work Act, 2014)\(^ {40}\). In contrast, although the legislation in Japan contemplates the return to work of the injured worker and their consequent work accommodation by the employer, it leaves certain room for decision on the particular organization. There is guidance material from the Ministry of Health, Labour and Welfare in Japan to prevent work related LBP\(^ {41}\) and also prevention guidance from the Japan Industrial Safety and Health Association\(^ {41}\). Safe Work Australia has practical guidance material to help employers prevent and manage WRMSDS more broadly\(^ {42}\).

**Labor market characteristics**

2019 unemployment figures were 2.4% in Japan and 5.2% in Australia\(^ {43}\). OECD employment protection legislation indicators in 2019 were higher for Japan (2.1) than Australia (1.7)\(^ {25}\). Both countries anticipate an increase of their retirement age: Japan from 63 to 65 (in 2025), and Australia from 66.6 to 67 (in 2023)\(^ {26}\).

**Culture**

The six cultural dimension scores from Hofstede’s-
the workers' accident compensation insurance was instated, which included physiotherapy services, under guidance on returning to work after an occupational injury. Since 2013 have physiotherapists been allowed to conduct injury prevention initiatives at the workplace. These relate to the health benefits of work which is important to the management of work injured/ill personnel. Physiotherapy Association is signatory to two guidelines: 1) the Comprehensive and Systematic Model (CCCS model) and 2) the Australian Physiotherapy Professional Practice Standards (CPPPS). The implementation, evaluation of efficacy, communication, and professional and ethical practice of physiotherapy practice is guided by standards. For this study, the authors prioritized, where possible, the practice guidelines in Japan focus on the prevention of work-related LBP and are endorsed by national bodies external to the physiotherapy profession. The Australian Physiotherapy Association is signatory to two guidelines relevant to the management of work injured/ill personnel. These relate to the health benefits of work and evidence based clinical practice.

Insights tool for Japan and Australia respectively were: Power distance (54, 38); Individualism (46, 90); Masculinity (95, 61); Uncertainty avoidance (92, 51); Long term orientation (88, 21); Indulgence (42, 71). These insights tool for Japan and Australia respectively were: Power distance (54, 38); Individualism (46, 90); Masculinity (95, 61); Uncertainty avoidance (92, 51); Long term orientation (88, 21); Indulgence (42, 71).

Physiotherapy practice norms

Information about physiotherapy practice demographics and norms in the two nations is presented in Table 1. In Japan, the law dictates that all physiotherapy treatment interventions are directed by the medical profession, which influences how both physiotherapy practice and OHP practice are conducted. In Japan in 2008, a medical fee for guidance on returning to work after an occupational injury was instated, which included physiotherapy services, under the workers’ accident compensation insurance. Only since 2013 have physiotherapists been allowed to conduct injury prevention initiatives at the workplace. In South Australia, varied physiotherapy services may be conducted (with remuneration) in relation to work injury/illness, these include: Treatment in rooms, Workplace visit,Physiotherapy management plan, and Telehealth consultation. Practice guidelines in Japan focus on the prevention of work-related LBP and are endorsed by national bodies external to the physiotherapy profession. The Australian Physiotherapy Association is signatory to two guidelines relevant to the management of work injured/ill personnel. These relate to the health benefits of work and evidence based clinical practice.

Organization of OHP practice

JSPTSOH was formed in 2013, and exceeded 6000 members in 2020. OHPA was formed in the mid-1980s (previously termed the Ergonomics and Occupational Health group) as of March 2021 the group had 311 members, (personal communication with APA, 2021). OHPA has a pre-mapped career/training pathway for OHP practitioners and professional practice standards for its members. JSPTSOH does not. The seven OHPA professional practice standards relate to: understanding work legislation, OHP knowledge, theoretically based interventions, tailored implementation, evaluation of efficacy, communication, and professional and ethical practice.

Discussion

General comments

To the best of our knowledge, this is the first investigation to compare Japan and Australia in relation to OHP practice. For this study, the authors refined the CCC model, that proved useful in the field of OHP practice, and was itself an adjustment of the original model from de Rijk. In the pursuit of fulfilling the CCC model’s requirements, the authors prioritized, where possible, the search of information in international resources/institutions that covered both countries, assuming they collect the data in an objective, homogeneous and independent manner.

Work-related legislation

Knowledge of work legislation is a requirement of OHP practice. Laws in both Japan and Australia protect the safety and health of all workers providing potential opportunities for physiotherapists with their expertise in preventing and managing WRMSDs which is a leading occupational malady in both countries. Work health and safety is achieved in both countries by promoting comprehensive and systematic measures for preventing industrial injuries/illnesses. The Australian legislation encourages return to decent work where possible in line with current evidence. Both countries have guidelines to prevent WRMSDs which could prove useful for OHP practitioners, and may reveal opportunities to learn from each other about OHP practice experiences. In Japan these include prevention measures for Low Back Pain at work, in Australia these encompass preventing WRMSDs more broadly using

Table 1. Physiotherapy practice in Japan and Australia

| National Association Practice Norms | Japan | Australia |
|-----------------------------------|-------|-----------|
| Gender (%female)                  | 36%   | 65%       |
| Minimum qualification to practice | Diploma | Bachelors Degree |
| Is registration required to practice? | Yes (licence) | Yes |
| Scope of practice defined by      | Ministry of Health or another government department (Government) | One or more independent regulation/licensing/registration authorities (Independent) |
| Practice is guided by standards   | Yes   | Yes, more than one |
| Educated for autonomous practice? | No    | Yes       |
| Is direct access permitted?       | No    | Yes       |
| Practising physiotherapists per 10,000 population | 10.27 | 14.25 |
| Telehealth services provision permitted | No | Yes |

APA, Australian Physiotherapy Association; JPTA, Japanese Physical Therapy Association. Reference was 43.
a risk management approach\textsuperscript{52}. Both countries share concerns about rising mental health issues in the community including at the workplace\textsuperscript{44}. Knowledge of the inter-relationship of mental health issues and WRMSDs is evolving, and may lead to a change in focus for all OHS stakeholders.

**Labour market characteristics**

Japan and Australia have differences in unemployment figures and Employment Protection. How these matters influence the role of the OHP practitioner warrants conjecture. Higher unemployment rates may encourage underreporting of non-fatal work injury such as WRMSDs\textsuperscript{51}). Workers in countries with low employment protection could also be further disadvantaged in aspects of work accommodation and return-to-work in conditions of higher unemployment\textsuperscript{52}. Physiotherapists including OHP practitioners may have reduced employment opportunities in times of high unemployment, which would likely change the ratio of physiotherapy practitioners (and possibly OHP practitioners) to head of population. The countries each have an ageing workforce, with increasing life expectancy and rising retirement age\textsuperscript{60}. WRMSDs account for a high proportion of compensation costs, particularly among older workers\textsuperscript{57}. National OHP subgroups have a strategic opportunity to promote OHP practitioners in assisting both employers and older workers by promoting health and wellness, providing treatment, appropriate work duties and tailored interventions\textsuperscript{51}.

**Culture**

National culture may influence business practices\textsuperscript{58}. As OHS is important within business practices and as physiotherapists are stakeholders in multidisciplinary occupational health teams\textsuperscript{53}, we posit the potential impact of culture on OHP practice in the light of Hofstede's dimensions\textsuperscript{27}. High long-term orientation in Japan may imply that once the field of OHP practice is embraced there, it could become a permanent component of business practice. Australian people tend to display more ease with uncertainty and seek as few rules as possible\textsuperscript{27}. Australia implemented Robens-style OHS legislation in the mid 1980s with a self-regulating approach\textsuperscript{40} in which stakeholders have broad duties. For Japan, reflecting on uncertainty avoidance could enable review of their current system and consideration of change strategies, such as expanding physiotherapists’ work circumstances and environments to encompass OHP practice.

Both countries show competitive (masculine) traits. For OHP practice, competition related to productivity may possibly (negatively) influence the accommodation of injured workers concerning modified hours or duties, and employers/workers driven by competition might underreport WRMSDs. OHP practitioners in their quest to promote early and durable return-to-work need to weigh up the inherent benefits of work against possible re-injury. Worksite visits may facilitate OHP practitioners understanding of suitable work duties and accommodation\textsuperscript{43-45}.

Occupational health physiotherapists require sound communication skills\textsuperscript{57} and egalitarian cultures may enable them to have useful discussions about suitable work duties with employees and supervisors at the workplace, and with Doctors about return-to-work. Low indulgence in Japan suggests that when OHP practitioners encourage accommodation and work hardening practices for return-to-work after injury/illness their efforts may result in some success and be durable. Individualism is higher in Australia than Japan. Perhaps this is reflected by autonomous physiotherapy practice in Australia, where being direct contact practitioners differs from Japan\textsuperscript{51}). Legislative permission for this to change is an ongoing and future challenge for the Japanese physiotherapy profession.

**Physiotherapy practice norms**

Like the national population, the physiotherapy association size, and the OHP group size are all larger in Japan than in Australia, although the ratio of practising physiotherapists per 10,000 population is higher in Australia\textsuperscript{46}. In terms of gender, physiotherapists in Japan are predominantly male, with the national gender employment gap remaining large and general work participation for women being limited\textsuperscript{47}. In Australia, by contrast physiotherapists are predominantly female\textsuperscript{48}. The influence on OHP practice derived from these gender differences among the workforce, national physiotherapists and OHP practitioners is yet to be determined.

The APA is signatory to both guidelines on the benefits of (decent) work\textsuperscript{49} and clinical practice\textsuperscript{51} providing Australian physiotherapists with clear direction for their interventions. Partnering with other stakeholders such as the medical profession clarifies that both professional groups support these initiatives. Having the JPTA or JSPTSOH as signatory on future medical guidelines may prove advantageous for both physiotherapy and OHP practice by highlighting an evidence based practice approach for practitioners, and alerting other stakeholders to the physiotherapeutic contribution in this field.

Besides on-site physiotherapy treatment in Australia, organisations in both countries may employ physiotherapists to conduct prevention and training at the workplace. In Japan work rehabilitation is only conducted in a medical setting\textsuperscript{44,45}. The fee schedule for Return to Work SA (2020)\textsuperscript{51} provides both clarity about what services physiotherapists currently provide for injured/ill workers in South Australia and the set fees. This accepted ‘norm’ for South Australian physiotherapists may be useful to frame future discussion about injury management practices in the two countries. The extended role of physiotherapists in the
authorization of work capacity certification for injured workers is a worthy future ambition. Not without challenges, significant headway has already occurred on this matter in one Australian jurisdiction, Victoria.

In both countries, education for a bachelor degree is of four years duration. In Japan final examinations are set nationally by the Ministry of Health, Labour and Welfare at the end of their study program requiring standardized curricula content, whereas in Australia university examinations are conducted throughout the program with some latitude for curricular content whilst meeting national competencies. These differences between the two countries may yield disparities in outcomes in knowledge, skills and competencies of OHP practitioners, whilst they share the challenge of incorporating OHP within their curricular content.

**Organisation of OHP practice**

OHPA has a longer history than JSPTSOH with more time to gain experience and develop processes. Both organisations advocate for OHP. Australia and the United Kingdom each have OHP professional practice standards requiring OHP practitioners to have good knowledge of OHP practice. At an organizational level these standards inform the choice and provision of educational material for group members and additionally provide marketing potential both within and external to the profession. JSPTSOH might consider whether future development of their own OHP professional practice standards would prove worthwhile.

Undergraduate education arguably may influence graduate choice of practice specialty. The current status of OHP within international undergraduate curricula is unknown and a topic for further research. At the Kansai University of Welfare Sciences, Osaka, Japan, OHP training is included in the physiotherapy undergraduate core curriculum, and is limited to basic information about the role of physiotherapists in this field. At the University of South Australia “all final year students complete a five week course”, including an industry placement, providing exposure to the nature of OHP practice. Occupational health physiotherapists in Japan might benefit from further expanding their OHP training, perhaps following a similar approach to that of the Australian Physiotherapy Association/OHPA in their quest to nationally promote OHP practice.

**Strengths, Limitations and Future Directions**

Two strengths of this study are that it is the first to attempt to compare OHP practice in Japan and Australia, and that the modified CCC model facilitated the investigators to explore some of the complexities that may influence OHP work. Therefore, the current study forms a basis for future comparative investigations between other nations. Some limitations are that there was no “guidebook” to help the investigators choose how best to define the five components of the model and the boundaries thereof, or where to find relevant supporting information. However, we anticipate that the current paper has initiated this process for use in future investigations.

**Conclusion**

The original cross-country comparison model developed by de Rijk A was adapted for relevance to OHP practice. The resulting model provided a structured approach to locate and analyse resources and data to satisfy the model’s components, permitting a comparison of contextual factors that may influence OHP practice in Japan and Australia. Underlying factors that may influence OHP practice in two countries lying within the same World Physiotherapy region are presented. Findings revealed some similarities (eg work-related legislation) and differences (eg OHP national subgroup maturity and activities) between OHP practices. Using the CCC model may enable occupational health physiotherapists internationally to have structured dialogue about their work and thus learn about and from each other. Ultimately, being informed practitioners and educators we anticipate will lay the foundations to pave the way for improvements in this discipline globally.

**Conflict of Interest:** The authors declare that there is no relevant conflicts of interest.

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