



School of Health Sciences

Summer Scholarship Research Program 2021

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Project 45: Establishing trans-professional inclusive competencies for the emerging health workforce

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Project Description

Research gap:

The absence of a current clear definition and articulation of core, transferable, trans-professional health workforce competencies that inform and guide inclusive work with vulnerable, disadvantaged and marginalised populations, makes it difficult to effectively prepare the workforce and plan and deliver essential services to support people who are most in need of appropriate care.

Background:

All individuals should have the opportunity to engage meaningfully in activities that promote their health and wellbeing. This unalienable human right is enshrined in the Australian legislative framework and again reinforced in the recent Royal Commission into Aged Care Quality and Safety report. However, it is well documented that people with disability, their families and carers experience poorer health outcomes. Similarly, poorer health and wellbeing are reported for other individuals and groups who are vulnerable, disadvantage or marginalisation. These groups include children and youth, Aboriginal and Torres Strait Islander peoples, LGBTIQ+, refugees and asylum seekers, migrants, CALD, older persons, rural and remote communities, people from low SES, and other minorities. Identified barriers often include “disabling, uncoordinated, inadequate and inequitable” health and support services. For example: failure of service providers and health professionals to understand co-existing needs; bias, stigma and discrimination; inadequate training; system failure to provide for longitudinal patient-centred and family-centred care; force delineation between health and support/ care services; mistrust and distrust from previous experience; tokenistic or lack of meaningful engagement with vulnerable, disadvantaged and marginalised consumers. Sub-optimal care and delayed intervention can exacerbate client problems, increase costs to the health system, and place undue burden on individuals, families and communities.

Professional education focusing on vulnerable, disadvantaged and marginalised communities is critical to achieving equitable health care and should be a core competency in the education of all health professionals. However, the specific aspects of this competency and how it should best be covered in medical, nursing, and allied health curricula may not always be clear, leading to further marginalisation of vulnerable care recipients (clients). Currently, professional competencies and educational accreditation standards ascribed by AHPRA for many health professions allude to marginalised or vulnerable populations but provide limited comment and the area is not well-defined. This can lead to ad hoc coverage, lack of appropriate scaffolding throughout the curricula and could confound the stigma educators are seeking to prevent.

Overlooking or misunderstanding the needs of vulnerable, disadvantaged and marginalised clients can lead to less than optimal care or missed opportunities for timely intervention. A consensus agreement on core, transferable skills that facilitate effective collaboration and inclusive approach to

working with vulnerable, disadvantaged and marginalised groups will assist in avoiding these problems by:

- Helping health workforce providers and employers to identify gaps and areas for improvement;
- Facilitating interprofessional and interagency communication and collaboration;
- Addressing the power imbalances between consumers experiencing vulnerability and health providers that can threaten positive outcomes;
- Promoting strengths-based, solution-focused models of health service provision;
- Helping students and emerging health professionals to maximise the effectiveness of therapeutic interactions, services, supports and advocacy.

This lack of identified competencies has implications for adequate health care experiences and health outcomes for vulnerable, disadvantaged and marginalised populations. Given this, a clear definition and consensus among providers, consumers and educators of what competencies are needed is an essential outcome. Such a consensus will guide educators in developing appropriate curricula to foster mastery of these competencies.

Project Aims

To define core, transferrable health workforce competencies that facilitate inclusive approaches for working with vulnerable, disadvantaged, and marginalised populations.

Project Methods

A modified Delphi method to develop and validate the competency framework with key experts (health professionals, consumers, carers, educators, students and new graduates) will be employed. These experts will be recruited by the CIs and via snowball recruitment from professional bodies, support organisations and consumer organisations. Based on preliminary discussion with stakeholders, we anticipate that up to 50 experts will be recruited and effectively managed through the Delphi process. Using the scoping review results (manuscript currently under review), the research team will compile a complete list of all competencies proposed or discussed in the literature. In the first phase of the Delphi process, the expert panel will be sent a description of the consensus task and the list of compiled competencies. Panel members will be instructed to rate the importance of each competency on the list and explain why they make this rating. They will also be encouraged to add any additional items (with importance weights and explanations) to the end of the list. Based on the first round the research team will classify items as agreement to include, agreement to exclude, not yet agreed and newly proposed. This list will be sent out for the second round of voting. Based on previous work we anticipate three rounds to achieve consensus. The level of consensus will be described using appropriate statistical tools including percentage agreement, kappa, correlation and Kendall's coefficient of concordance. Cronbach's alpha and Spearman's correlation coefficient will be used to verify the reliability and validity of the competency framework. Information about experts will be requested during the process. The authority of the experts will be expressed by authoritative coefficient C_a . We shall aim for $C_a > 0.7$. This methodology was successfully utilised by the research team members in developing multidisciplinary core competencies for health and aged care workforce. The various School of Health Sciences academics were involved in the formulation of this project and were named in the 2020 ANZAPHE research grant application. The modified application has been re-submitted for 2021 and currently awaiting outcomes.

The student will be required to contribute to this project by reviewing and updating the academic literature on the topic. The student will also assist with the recruitment, deployment of Delphi surveys, analysis, and report writing.

Opportunity for Skill Development

By the end of this project, the student will be able to:

- Use Qualtrics to input data for surveys or data collection, in this case the initial Delphi round
- Undertake basic descriptive statistics and quantitative data and perform correlation assessments under guidance

Students are required to have the following skills/meet the following pre-requisite(s) to apply

Willingness to learn, hardworking, basic understanding and interest in the health needs of all community members

Project 46: First do no harm: the importance of de-roling following educational mental health simulations

Supervisor(s): Liz Thyer - e.thyer@westernsydney.edu.au
Principal Supervisor

Paul Simpson - P.simpson@westernsydney.edu.au
Second Supervisor

Project Description

Primum non nocere, first do no harm. It is imperative to provide health professional students with the most comprehensive evidence-based education, but in doing so, we must be aware of potential harms that may be a by-product of the educational process.

Mental health and substance abuse disorders contribute the second highest non-fatal burden of disease in Australia with 45% of Australian adults estimated to suffer a mental disorder at some stage in their life. Yet there are considerable gaps in the services provided to these patients with many relying on emergency departments and ambulance services to provide a stopgap. Consequently, mental health patients constitute an increasing proportion of patient demographics across all health professions, a fact that is reflected in the prominence and time devoted to education of health students on this topic.

To best prepare health students to assess, manage and treat these patients, it is important to compliment theoretical learning with practical simulations in which students varyingly act as clinicians, bystanders or patients. This training provides insights into all roles, but could also lead to increased personal stress or feelings attributed to the 'patient role' if appropriate de-roling is not undertaken. Given that 75% of lifelong mental health disorders have their first presentation prior to 25 years of age, this is also a time when many students may be dealing with their own, or close peers, mental health challenges underscoring the imperative to care for students' mental health as well as provide educative experiences.

Stafford defines de-roling as a concept that "identifies the ways in which the actor differs from the character in the role assumed and attempts to discard the parts that do not belong to him". Although de-briefing, "the discharge of emotion and capturing [of] the learning" is well discussed in the literature, de-roling is not commonly considered which, given the conceivable negative consequences to participants and their possible vulnerability, is a considerable oversight. Prior to developing a framework through which appropriate de-roling in mental health simulations might occur, it is necessary to understand the broader literature which is the primary aim of this review.

Project Aims

The project aims to provide a systematic overview of the available research evidence in relation to the concept of de-roling from mental health simulations in tertiary education.

Project Methods

This project will utilise a review methodology, however the specific type of review will be determined in the early stages of the project. As Munn and colleagues note, the rationale for undertaking a scoping versus a systematic review is dependent upon the amount that is known and the desired outcomes. It is likely, given the paucity of research in the area, that it will be a scoping review, however this will be determined in consultation with the student and form an important part of their learning.

Irrespective of type of review we will follow the guidance set out of the JBI Manual for Evidence Synthesis and follow the PRISMA or PRIMSA-ScR checklists; any protocol will be published prior to commencement of the literature search to assure rigour.

Opportunity for Skill Development

Upon completion of this project the student will be able to:

- Choose the appropriate review to answer a research question and understand the differences between various review types
- Formulate a prior review search protocol and publish it
- Use Covidence software
- Search for, screen, critically review and assess research articles
- Apply an appropriate screening tool to select research articles
- Co-author a publishable peer-reviewed review paper

Students are required to have the following skills/meet the following pre-requisite(s) to apply

This project is likely to appeal to students who have an interest in or are enrolled in health or education related degrees.

A passion for providing the best health education possible is the only prerequisite.

Project 47: What is therapy

Supervisor(s): Nicole Peel - n.peel@westernsydney.edu.au
Principal Supervisor

Project Description

The School of Science and Health currently offers bachelor and post graduate courses and degrees in different forms of therapy including physiotherapy, occupational therapy, speech therapy and recreation therapy. There is also the potential that there may be university staff outside the school of health sciences researching or teaching units with a focus on therapy within their disciplines, for example horticulture, animal, music, art, child life and bush therapy.

The current university offerings define what their disciplines are including in terms of scope of practice, competencies and so on, and in turn develop teaching curricula and resources to align with these requirements. Each of these offerings is specific to a discipline and, within that discipline, one or more contexts; and yet each one involves the application of therapy. Within the literature there is little information on what constitutes therapy, over and above a common or garden dictionary definition. Therapy is defined as the intervention following a medical diagnosis of a health problem.

Thornton & Ocasio (1999) discuss a concept of institutional logics within organisations that includes practices, beliefs, rules, order, meaning of material and symbolic elements that provide a social reality. Institutional logics will be used as a framework to understand therapy across the disciplines. With the idea that therapy may be a philosophy with its own fundamental values, rules, constraints, beliefs and meaning and the practice element comes with the particular discipline/context, which sometimes adds values, rules, constraints, beliefs and meaning of its own. It is proposed that there may be some economies of scale available to teaching practices and resources allocation from the establishment of a commonly agreed foundational or preparatory unit common to all offering the university makes under the banner of Therapy. There may also be benefit in understanding therapy for future workforce requirements within the expanding health sector. This project will involve a desktop review of what each professional organisation outline as therapy and the practices they use.

This project is part of a larger project where a greater understanding of therapy across the literature and profession organisations is assisting to build a foundation of interventions.

This project will involve the searching of literature and undertaking the beginnings of a scoping review. This project fits into a bigger picture of Therapy.

Project Aims

This project aims to explore the definition and practical application of therapy across different professional therapy organisations.

Project Methods

This project will involve the student learning how to search the literature, how to select the appropriate articles for review and how to appraise the articles selected for review and write these into a comprehensive document.

Opportunity for Skill Development

The student will develop skills in literature searching, critically appraising literature and conveying their readings into a written form. In essence early research development skills.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

- Passion and attention to detail.
- Interest in social justice issues.
- Curiosity in scientific principles.

A background in social sciences, psychology, health sciences or education is desirable

Project 48: Better understanding motivation towards exercise for people with poor mental health: The voice of the general community through Beyond Blue online forums.

Supervisor(s): Rhiannon White - Rhiannon.White@westernsydney.edu.au
Principal Supervisor

Project Description

Mental health disorders are the largest contributor to burden of disease, and the largest cause of disability worldwide. The impact of mental health disorders is so extensive that a 14-year gap in life expectancy exists between those with a mental health disorder and the general population. Abundant evidence supports a positive relationship between physical activity and mental health, and physical activity has been generally accepted as an appropriate method of improving mental wellbeing. However, physical activity levels remain low worldwide, and in fact, physical activity levels are lower among people with a mental health disorder. Abundant evidence consistently demonstrates that intrinsic motivation is one of the strongest predictors of physical activity, but a lack of motivation is a commonly cited reason for not engaging in exercise for people with a mental health disorder, both in research findings and in public forums. In order for future research and physical activity programs to be beneficial, we need to understand how to promote motivation towards exercise specifically for people with poor mental health. The work undertaken as part of this summer scholarship will help to answer this question and will contribute to the development of an exercise intervention for people with depression and anxiety in 2022, pending a successful Researcher Development Grant.

Project Aims

The overarching aim is to better understand motivation towards exercise for people with a mental health disorder.

To achieve this aim, there are three research questions:

1. How do people experience, encounter, and describe motivation towards exercise when experiencing symptoms of depression, anxiety, or stress?
2. How does the academic literature describe motivational strategies in previous interventions?
3. What do previous studies suggest regarding exercise preferences for those with poor mental health?

Project Methods

1. To answer question 1, the student will extract text from the freely available and accessible Beyond Blue online forum. This online forum includes a range of conversations, thoughts, and reflections, by the general community about exercise. After extracting the text, the student will conduct qualitative analysis on the forum conversations to draw out common themes among people's perspectives of exercise, exercise motivation, exercising specifically for improving mood, and the challenges to engaging in exercise while having a mental health disorder.
2. To answer questions 2 and 3, the student will review, summarise, and report on, existing literature.

Therefore, the two main methods being used are literature reviewing, and qualitative data analysis. From this, the student will gain a strong appreciation for, and understanding of, research on physical activity and mental health.

Opportunity for Skill Development

Upon completing this project the student will have gained exemplary skills in reviewing literature, managing data, and conducting qualitative data analysis. The student will also gain practical organisational and time management skills. The project will provide an understanding of research in the physical activity and mental health field and could also be useful in a future sport, health, exercise, or PE career if the student does not go down a research path.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

A 2nd year Health and Physical Education, Sport and Exercise Science, Health Promotion, or Psychology student would be an ideal candidate. But this is not required. What is required is a hardworking, organised student, with a genuine interest in research.

Project 49: Prediction of peak, resultant and rate of tibial acceleration during running for low operating range accelerometer

Supervisor(s): Roy Cheung - Roy.Cheung@westernsydney.edu.au
Principal Supervisor

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Second Supervisor

Project Description

Distance running is a popular sport as well as a good choice of exercise for general fitness. However, musculoskeletal injury in runners is very common. According to previous epidemiology studies, up to 79% of runners incur an injury each year. Biomechanically, high tibial acceleration metrics (i.e., axial, resultant and rate of tibial acceleration) has been associated with a wide range of ailments, such as stress fracture and patellofemoral pain. With the advancement of wearable sensor technology, this biomechanical parameter can be measured using wireless accelerometer or inertial sensor. However, some low range accelerometers (e.g., 16-g range) may not be sufficient to cover the impact loading of a running strike (i.e., up to 25-g). Using a high range accelerometer would lead to poor signal-to-noise ratio. Therefore, an algorithm to recalculate the missing data exceeding the measurement range of tibial acceleration is warranted.

Project Aims

This study aims to validate axial, resultant and rate of tibial acceleration derived from the acceleration signals between 3 conditions:

1. Low: Raw acceleration signal sampled using a low range accelerometer (± 16 -g)
2. Low: Corrected acceleration signal sampled using a low range accelerometer (± 16 -g)
3. High: Raw acceleration signal sampled using a high range accelerometer (± 200 -g) i.e., ground-truth

Project Methods

Participants

15 healthy (free from any injury in the past 3 months) young (18-45 yo) individuals who is physically fit for running for 45 minutes will be recruited for this study.

Testing session

Two dual-accelerometer IMU devices (Blue Trident Dual-g IMU, Vicon, New Zealand; dimensions: 42 x 27 x 11 mm; weight: 9.5 g) will be used for this experiment. Each IMU has two accelerometers encased: Low-G (± 16 -g) and High-G (± 200 -g). The IMUs will be strapped on to the anteromedial aspects of both the left and right distal tibias of the participants. The y-axis of each accelerometer will be aligned to the long axis of the tibia. The accelerometers will be set to capture acceleration data simultaneously at 1,000 Hz.

The participant will complete an outdoor run in this experiment at his/ her own usual speed. Participants will run on a concrete path (approximately 270 m) near Building 24, Campbelltown Campus, Western Sydney University. They will be asked to complete 5 running bouts and the total running distance travelled will be approximately 1,350 m. Participants will be allowed to have rest during the test.

Data processing

Synchronized acceleration signals will be processed using MATLAB (MathWorks, USA). Clipped data which exceeded the operating range (i.e. 16-g) of the Low-G accelerator will be identified from each of the axes. A window of 3 data points before and after the clipped portion will be used for the recalculation of peaks using the spline() function in MATLAB. The reconstructed signal after interpolation will be regarded as Lowcorrected.

All acceleration signals (Low_{raw} , $Low_{corrected}$ and $High_{raw}$) will be processed with the same customized MATLAB code. For each footstrike, the peak tibial acceleration in the axial and resultant ($AccR = \sqrt{AccX^2 + AccY^2 + AccZ^2}$) signal will be identified. The slope between 30 and 70% of the amplitude of the peak axial acceleration will be defined as rate of tibial acceleration.¹⁷

Statistical analysis

Intraclass correlation coefficients (ICC2,1) and 95% limits of agreement will be used to assess the agreement between acceleration variables. Additionally, mean differences and root mean square errors will also be calculated.

COVID Contingency

In view of the current COVID lockdown, data collection from human participants may be an issue. If lockdown persists, I will ask my current students in Calgary, Canada or Hong Kong, China to collect data, and we will continue with data processing and algorithm development.

Opportunity for Skill Development

The supervisory panel will go through technical biomechanics calculation and essential concepts in wearable sensor prior to the project commencement. The student will be able to have basic knowledge in conducting a human research, including obtaining participants' consent, experimental setup, data processing and analyses. I also expect the student's contribution in preparing a manuscript after the project.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

There is no prerequisite for this study. However, we prefer to have a student who is a distance runner.

Project 50: Learning research experience and evidence through conducting a Systematic Review and publication: The effectiveness of acupuncture (including electroacupuncture) for sports injuries of rugby league players.

Supervisor(s): Shengxi (George) Zhang - George.zhang@westernsydney.edu.au
Principal Supervisor

Yu-ting Sun - Yu-ting.sun@westernsydney.edu.au
Second Supervisor

This project is in partnership with **Cabramatta Rugby League Club**

Project Description

This project aims to evaluate the effectiveness and safety profile of acupuncture on common sports injury of rugby league players from synthesising the data of randomised control trials.

As many as 1 in 4 rugby league players will be injured in the sport. Most injuries are related to impact or collision style injuries. Tackling is particularly guilty of causing injury either on the initial impact or with secondary tackles.

In regards to the aspects of injury, the data indicates acute injuries to the lower limb are most common. Common types of injuries are musculoskeletal bruising and strains and joint, ligament and tendon sprains. Besides acute sports injury, chronic injuries such as tendinopathies, a result from failed healing and initial response to treatment, account for 30-50% of all sports injuries and can be debilitating for nearly 3 years.

Acupuncture, both manual and electroacupuncture, has been used in traditional Chinese medicine (TCM) as an important approach with appealing benefits to the treatment of sports injuries on musculoskeletal strains. The benefits of acupuncture include pain relief, inflammation reduction, and relaxation of the contracted muscle fibres.

For chronic sports injuries on muscles and tendon, after the reductions of pain level, athletes will be able to facilitate a gradual return to start gentle aerobic exercises and move on to eccentric training and rugby specific drills. In addition to above benefits, unlike prescription medications for pain relief and rehabilitation in sport injury, acupuncture produces limited side effects [8], which is beneficial to athletes where any drug side effects can affect training and performance, and where doping regulations have become increasingly strict on what can legally be consumed. Hence, the acupuncture is an appealing option in rehabilitation for sports injury without significant side effects, and no lasting adverse events.

The engaged undergraduate student will have the opportunity to gain research experience on the evidence of acupuncture for the effectiveness and safety profile of acupuncture on common sports injury of rugby league players on competitive seasons and presenting their findings via a written report and seminar presentation. Within a limited time, the project will be a pre-study to inform design of a new trial, but also to discuss results in the context of previously existing evidence

combining all the information from both published and unpublished studies and then summarising the findings.

This new project is important to build up a strong partnership with the Cabramatta Rugby League Club for the Greater Sydney. It has been mutual agreements that a research team with expertise in acupuncture in SoHS WSU will work closely with the Club to focus on the common musculoskeletal injuries of the rugby players. This project is also considered the current lockdown restrictions may be extended as a result of COVID-19 restrictions in place.

Project Aims

This project aims to:

- To evaluate the clinical effectiveness and safety profile of acupuncture on common sports injury of rugby league players on competitive seasons;
- To train students to develop research interest and skills;
- To prepare for a joint grant application as evidence of track record of collaboration as well as actual preliminary research findings.

Project Methods

The methods have been developed in accordance with Cochrane Handbook for Systematic Reviews of Interventions. Student will be required:

- To conduct a literature search, in English biomedical databases, including MEDLINE, EMBASE, CINAHL, AMED, CENTRAL and PsycINFO;
- To screen search results and extract data from relevant articles;
- To learn how to analyse and synthesise data following the handbook protocols with supervisor guidance;
- To compile results in report.

Opportunity for Skill Development

Through this hands-on experience, student will have an opportunity to grow their interest in research, and value the needs of using scientific evidence-based approaches for appraising clinical findings through publications. In particular, student will learn the following skills:

- Organising and managing the review process;
- Understanding search methods;
- Applying the Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) to appraise trial designs and reports, to make more informed judgments on the quality and style of acupuncture trials;
- Applying the Cochrane risk of bias tool and assessing risk of bias in critical appraisals;
- Understanding the rationale and basic methods of meta-analysis;
- Using RevMan for review writing and meta-analysis;
- Using evidence to manage studies, risk of bias and data.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

Student is at the second Year or above of the Bachelor of Traditional Chinese Medicine or equivalence.

Project 51: A novel test of lung diffusion (and perfusion) capacity during exercise

Supervisor(s): Simon Green - simon.green@westernsydney.edu.au
Principal Supervisor

Chloe Taylor - C.Taylor@westernsydney.edu.au
Second Supervisor

Belinda Cochrane - belindacochrane@bigpond.com
Third Supervisor

This project is in partnership with **Western Sydney University School of Medicine & South West Sydney Local Health District**

Project Description

COVID-19 is fundamentally a disease of the lungs, associated with primary pathophysiological effects on the airways (epithelial cells) and vasculature (endothelial cells) of the lungs and usually accompanied by breathlessness, especially provoked by mild exertion. These effects should manifest as an impairment in the diffusion capacity of the lungs – termed lung diffusion capacity – either at rest or during mild exertion. However, the long-term effects of COVID-19 or related syndromes on pulmonary diffusion capacity at rest or during exercise have not been established. Clinically, there is no standardised test of exercise-related pulmonary diffusion capacity.

This project is focused on developing an exercise-related test of pulmonary diffusion capacity for clinical application. It will build on a recent and successful summer scholarship project (Caitlyn Russell in 2020-2021 supervised by the same supervisory team) which initiated the development of this novel test and provided supporting evidence in support of its validity and utility. In that project the summer student and her research team successfully measured lung diffusion capacity during exercise and developed what we think is a more effective approach for application to clinical testing than has been described in the scientific and clinical literature to date. The present summer scholarship project will involve the incorporation of a new measurement – cardiac output – into the testing protocol. This new measurement will be incorporated into the same procedure used to measure lung diffusion capacity so that estimates of ‘diffusion’ and ‘perfusion’ (cardiac output) can be made simultaneously. Compared with conventional measurements of lung diffusion capacity which do not include measurements of lung perfusion, our approach may prove to a more powerful one in the diagnosis of impairment in lung diffusion capacity. This has very significant implications, especially with respect to conditions such as COVID or more common respiratory diseases, such as chronic obstructive pulmonary disease (COPD), which have the potential to impact both diffusion and perfusion.

The new test will be assessed using a small number of healthy subjects from within the research team (n = 3-4). The design of the new experimental protocol will involve the troubleshooting of an exercise protocol combined with repeated measurements of cardiac output and pulmonary diffusion capacity, with its clinical application in mind. The summer scholarship student will be guided along a learning journey where he or she will begin to learn and apply the basic techniques (exercise testing, pulmonary diffusion capacity assessment), analyse some data, and create a presentation that

demonstrates an understanding of cardiopulmonary physiology contextualised to COPD and COVID-19.

Alternative Project: If COVID-19 prevents access to the research laboratory, the student will write a literature review focused on 1) technical aspects of measuring cardiac output and pulmonary diffusion capacity at rest and during exercise, as well as 2) effects of exercise on cardiac output and pulmonary diffusion capacity. The primary supervisor has started developing the technique for measuring cardiac output and data, if collected before November, might be used to support the student's learning of technical aspects of the measurement of cardiac output along with data already collected for pulmonary diffusion capacity.

Project Aims

The aim of this project is to continue the development of an experimental protocol that, in the longer-term, will be used clinically to assess exercise-related pulmonary diffusion capacity in different clinical research scenarios, including COVID-19. The academic aims of this specific project are to:

1. Introduce an undergraduate student to scientific research and an important area of clinical physiology,
2. Teach the student new laboratory and data analytical skills, and
3. Hopefully help the student make an informed decision about studying in the Masters (Research) program.

Several of the experimental techniques require a substantial theoretical and technical background which the vast majority of undergraduate students do not have. The student involved in this project will also be engaged in some learning of this background.

Project Methods

This summer student project is a 'pilot study' that will involve a maximum of 3-4 healthy participants. Within a single testing session, each participant will undergo a series of evaluations of pulmonary diffusion capacity and cardiac output at rest and then during a stepwise exercise protocol. Pulmonary diffusion capacity will be assessed using the 'DLCO' technique while cardiac output will be measured using acetylene added to the same 'test gas' used to measure DLCO. Exercise will be performed using a computer-controlled recumbent cycle ergometer. The student will be introduced to all experimental techniques and the complexity of controls and calibrations required, focusing mainly on the cardiac output technique. The student will perform some basic analyses of data to present in their final report and oral presentation.

Opportunity for Skill Development

The summer scholarship student will be guided carefully along a journey of developing basic scientific skills (e.g., rigorous note-keeping, 'quality' control), preliminary learning of experimental techniques related to exercise testing and assessment of breathing, working with human subjects, as well as a constrained analysis of data. The focus of learning will be on careful reading and clarity of thinking, patience and discipline of behaviour, and experimental rigour. The 'size' of the experiment will be kept small so that these scientific virtues can be better appreciated and developed by the student.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

Eligible students must be in the third year of a Sports and Exercise Science degree OR third year of a Medical Sciences degree and have studied exercise physiology.

Project 52: Acupuncture for anxiety and stress in rugby league players during competition season: a feasibility study

Supervisor(s): Yu-Ting Sun - Yu-Ting.Sun@westernsydney.edu.au
Principal Supervisor

George (Shengxi) Zhang - George.Zhang@westernsydney.edu.au
Second Supervisor

This project is in partnership with **Cabramatta Rugby League Club**

Project Description

The project aims to understand feasibility on conducting a clinical study on use of acupuncture therapy on anxiety and stress induced mental fatigue in rugby league players during the competition seasons. Mental fatigue has known to be a factor impacting physical performances as well as cognitive performances in sport activates. Studies has shown that during a competitive season, sports players carries stress and anxiety which negatively influenced overall performances. High stress during the game further deteriorates player's ability to recover from mental fatigue.

Acupuncture has shown to be beneficial in the management of anxiety and stress related symptoms (Pilkington, 2010). Studies have shown that acupuncture decreases anxiety prior to a competition, which may both physical and cognitive performances of the rugby league players.

This project is a collaboration with Cabramatta Rugby League. The primary objective is to evaluate the feasibility and acceptability on use of acupuncture for mental fatigue in rugby league team for a future large-scale of randomised controlled trial. Recruitment, retention and adherence rates will be assessed. The secondary objective is to evaluate the reduction of the level of anxiety associated with competitions and the safety profile of acupuncture intervention. The Competitive State Anxiety Inventory-2 (CSAI-2) and adverse event log will be used as outcome measurements respectively. This study is a two-arm with 40 participants (acupuncture and wait-list) pilot trial for a RCT with a 4-week intervention. The randomised controlled design with a 1:1 allocation ratio.

Sample demographics and player medical histories will be summarised at baseline using sample means and proportions with corresponding 95% confidence intervals. The secondary outcomes will be addressed using a mixed linear model over time, and T test or Mann–Whitney U test at each time-points.

This project is new but important for building a strong partnership with the Cabramatta Rugby League Club for the Greater Sydney. It has been mutual agreements that a research team with expertise in acupuncture from WSU will work closely with the Club to improve the mental health conditions for the members of the rugby team. To encourage students to become part of this research endeavour, I would like to recruit a student to assist with the design of the project and making an ethics application. The successful preparation will enable an implementation of the clinical study in the near future. The design of this summer student project is proposed in consideration of the current COVID-19 pandemic while strict lockdown is in place in the area.

Student of the Bachelor of Traditional Chinese Medicine is preferrable, however opportunity is open to non-TCM students who has solid research knowledge and skills in health sciences.

Project Aims

This project aims to examine if it is feasible to conduct a randomised controlled trial, for gathering evidence to improve the design of the future study on the effectiveness and safety of acupuncture for mental fatigue in rugby league team

There are two objectives:

- Primary objective - to examine the feasibility and acceptability of the study protocol (recruitment, retention and adherence rates).
- The secondary objective - to evaluate the reduction of the level of anxiety associated with competitions and the safety profile of acupuncture intervention

Project Methods

The research method of this project will be conducted as randomised controlled feasibility trial. The student will be involved in study design and ethics application including developing participant information sheet, consent form, adverse effect logbook and data management.

Opportunity for Skill Development

Upon completion of the project, the student will gain relevant experience and skills on clinical research methods in the area of complementary medicine in particular acupuncture and mental health area. The student will also gain opportunities to develop and advancing their research path through potential outcome publications.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

Student of the Bachelor of Traditional Chinese Medicine is preferable, however opportunity is open to non-TCM students who has solid research knowledge and skills in health sciences. Student who possesses excellent English academic writing skills is essential.