COACHES' KNOWLEDGE OF INJURY AND ASSOCIATED RISK FACTORS AMONG YOUNG TRACK AND FIELD ATHLETES:

A case study on the Western Cape Talent Development Programme (TDP) branch of the Mass participation, Opportunity and accessibility, Development and growth (MOD) programme for U12-U14 track and field athletes

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DECLARATION

I, Neda Isaacs (ISCNED001), hereby declare that the work on which this dissertation is based is my original work (except where acknowledgments indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

Signed by candidate

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14 MARCH 2021

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LIST OF ABBREVIATIONS

Abbreviation	Definition
ASA	Athletics South Africa
D&CP	Demographics and Coaching Practices
DCAS	Department of Cultural Affairs and Sport
FHS	Faculty of Health Sciences
HREC	Human Resources Ethics Committee
IAAF	International Amateur Athletics Federation
IQR	Interquartile Range
MCQ	Multiple Choice Quiz
Md	Median
Mo	Mode
MOD	Mass participation, Opportunity and Development and Growth
NSRP	National Sports and Recreation Plan
Q	Question
SA	South Africa
SANCF	South African National Coaching Framework
SD	Standard Deviation
TDP	Talent Development Programme
UCT	University of Cape Town
WC	Western Cape
WPA	Western Province Athletics

GLOSSARY OF RESEARCH TERMS

Term	Definition
Adolescence	Period between following childhood in which human growth and development occurs (ages 10-19 years) (1)
Athletics	The general name for a particular group of sports in which athletes compete, including running, jumping and throwing (2)
Coach	An individual who is responsible for their athletes training and performance (3)
Community Sport	Sport that is accessible, affordable providing an opportunity for community members to partake in recreational or competitive sports participation (4)
Face validity	The degree to which selected experts/professionals judge the item of an assessment instrument are appropriate to the targeted construct and assessment objectives (5)
Injury Prevention	Methods used to diagnose and intervene with injuries to limit the development of disability or reduce the risk of re-injury (6)
Socioeconomic status	Social and economic factors influencing the position of an individual or group within a society (7)
Sports Injury	Physical harm or damage to the body as a result of exercise or sports participation (8)

SYNOPSIS

Background: The management, prevention, and recognition of injuries forms an integral part of coaches training. It is imperative that coaches are equipped with a sound understanding of specialised coaching to teach developing athletes correct performance techniques, promote strategies to reduce the risk of injury, and be able to determine the need for medical attention in the event of an injury (9). The South African Department of Cultural Affairs and Sport (DCAS) has created opportunities for young people living in low socio-economic settings to participate in various sports within the Mass participation, Opportunity and Development and growth (MOD) programme (10). Athletes showing potential for competing at a provincial or national level are selected into the specialised Talent Development Programmes (TDP). The MOD and TDP also provides an employment opportunity for coaches. At present, very little is known about the knowledge and practices of coaches working with young athletes in low socio-economic settings within South Africa.

Aim and Objectives: The aim of the present study was to investigate the knowledge and practices of youth athletics coaches employed by the Western Cape (WC) TDP branch of the MOD within the under 12–14 year age group. The specific objectives were to: 1) describe the coaches qualifications and experience, using an online Demographic and Coaching Practices (D&CP) questionnaire; 2) assess coaches' knowledge regarding athlete development, injuries, and the management of injuries using an online Multiple Choice Quiz (MCQ); 3) describe coaches practices regarding injury prevention techniques using the D&CP questionnaire and 4) assess the relationship between the coaches a) experience and their MCQ scores, b) qualification and MCQ score, and c) qualification in first aid and the MCQ subsection score relating to injury and injury management.

Method: A descriptive cross-sectional design was used. Inclusion criteria were: 1) coaches associated with the TDP for Athletics in the WC, 2) coaches with > one year's experience coaching U12-14 athletics, and 3) access to internet. Exclusion criteria were: 1) coaches <18 years, and 2) coaches with < one season coaching experience. Ethics approval was granted by the University of Cape Town Human Research Ethics Committee (HREC REF 554/2019). The online MCQ consisted of 40 questions covering topics relating to coaches' knowledge and understanding of methods used to reduce the risk of injury and management of acute injuries. The D&CP questionnaire included questions related to the practices used by coaches to reduce injury risk and management protocols used during pre-season, training, or in competition.

Results: Twenty-six coaches consented to participate; five coaches exercised their right to withdraw after having only completed the online MCQ component. *Profile of coaches:* 16 of the 21 coaches (76.19%) reported having a coaching qualification. Most coaches were certified by Athletics South Africa (n = 12; 57.14%). Most coaches (n = 17; 81%) held a first aid qualifications ranging from level one to three. Participants' experience ranged from less than five years to 15 years (median = 7 years; IQR = 10.5 years). *Performance on the MCQ*: The median score achieved by the coaches (n = 26) for the MCQ was 14 out of 40 points (35%; IQR = 4) and only two coaches achieved a score greater than 50%. *Coaching Practices:* Most coaches (71%) used 30-minute warm-up sessions which included various exercise techniques. During warm-ups, a few of the coaches (n = 11) included static stretching, while the majority (n = 19) included dynamic stretching techniques. During competition season, most coaches encouraged athletes to complete a cool-down following each event (n = 17; 80.95%). Most coaches (90%) incorporated a pre-season conditioning programme, lasting an average of 7.5 weeks (range = 2-16 weeks).

Injury Management: 19% of coaches relied on the first aider present at each training session. Sixteen of the 21 coaches depended on medical professionals to make the final decision regarding to returning the athlete to training and competing, and 38.5% (n = 26) of coaches believed it was the coach or parents' decision. *Relationship between MCQ Performance and Coaching profile*: A moderate correlation between coaches' years of experience and MCQ score was found, however this was not significant ($r = 0.43$; $p = 0.054$), and weak non-significant correlations were found between MCQ scores were not significantly for groups of coaches who held or did not possesses a coaching qualification ($u = 37$; $z = 0.21$; $p = 0.84$). There was no difference between coaches who had a first aid qualification and those who did not on the MCQ test scores ($u = 22$; $z = 1.03$; $p = 0.32$).

Discussion and Conclusion: Coaches' knowledge regarding injuries, practices used to reduce the risk of injuries, and the acute medical management of injuries is less than optimal. Several coaches performed poorly on the MCQ, and some practices used by the coaches in our sample were questionable. Despite the majority having qualifications in both coaching and first aid, their understanding relating to injuries and the practices used did not always reflect the latest guidelines for coaching youth athletes. The findings of the present study are similar to the findings of others studies (11). This may be as a result of insufficient coaching development throughout their careers. The present findings indicated that 42.3% of TDP coaches still use outdated warm-up techniques (i.e., static stretches). Coaches are generally aware of the importance of strength and conditioning programmes. The moderate correlation between years of experience and MCQ score suggests that coaches do gain implicit knowledge through their experience. As health professionals working in the field of sport, physiotherapists are key allies for sharing knowledge with coaches. Empowering coaches with the knowledge and skills required to reduce the risk of injury development and manage injuries appropriately may, in turn, provide developing athletes with the support they require.

Keywords: Coaching, Athletics, South Africa, talent development, community sport, Low-socioeconomic community, coaching practice, injury management.

CHAPTER ONE: INTRODUCTION AND SCOPE OF THE DISSERTATION

1.1 Introduction

1.1.1. The Mass participation, Opportunity and Development and growth Programme

The South African Department of Sports and Recreation is responsible for creating sporting opportunities for all South Africans, and has recognised sport as a tool for change amongst youth living in low socio-economic communities (12). As such, the Western Cape Department of Cultural Affairs and Sport (DCAS) has initiated sporting and cultural programmes within low socio-economic communities targeting youth groups (10). The Mass participation, Opportunity, and Development and growth (MOD) programme is one of the largest government sporting programmes within the WC. The MOD programme, in partnership with schools and community sporting facilities, aims to promote positive after-school activities to reduce youth involvement in gangsterism and other high-risk behaviours (10). The Talent Development Programme (TDP; a branch of the MOD programme) identifies young individuals (from 11 years of age) with enhanced trainability and directs them into a particular sporting code (10). Young athletes who show potential are given the necessary resources and guidance to specialise and potentially compete at a provincial or national level.

1.1.2. Athletics coaching within the MOD program

The MOD and TDP encompass a variety of sporting codes. Athletics is one of the largest sporting codes amongst the youth within South Africa (SA) and particularly within the Western Cape (WC) region, forming one of 16 priority school sporting codes.

Young athletes demonstrating significant aptitude within a particular sporting discipline are often encouraged to develop their performance abilities from an early age. While specialisation in youth sport has gained popularity, it has also been reported that young athletes who maintain intensive training levels are at an increased risk of adverse physical and psychological effects (1). Therefore, complete insight into training guidelines for youth athletes is critical to understanding their development. This should include comprehensive knowledge regarding the factors affecting child development including maturation, common injuries, and associated injury risks (13). The opportunity to work closely with athletes from a young age provides coaches with the ability to monitor their ability and progress as they mature over time. The use of screening, adequate warm-up and cool-down techniques, physical conditioning, technique training, education of recovery interventions as well as injury reporting and monitoring which are key components to be used in the promotion of athlete development (14). In addition, knowledge of optimal training strategies for adolescents allows for coaches to make informed decisions regarding training volume and intensity.

1.1.3. Coaching considerations for developing athletes

Adolescence is a time of physical adaptation where young athletes are increasingly susceptible to injury (15). Particularly within low-income community settings, it is important that coaching education programmes include training related to the identification and understanding of basic medical conditions, as well as an understanding of the various available methods of referral (16).

Education on the signs and symptoms of common conditions associated with the sport and age group concerned will allow for early detection and treatment, reducing the risk of the long-lasting effects of injury (17). Medical practitioners are not generally available within community-based sporting clubs or at schools within lower socio-economic settings. Therefore, coaches are required to use their understanding and knowledge to guide these athletes appropriately (14). Within these settings, coaches may be required to teach safe performance techniques, promote injury prevention, and guide the appropriate attitude toward injury management (18). To perform these functions, coaches are expected to have an adequate awareness and knowledge of issues related to injury and create an environment that is focused on athlete wellness and not simply on results. A prospective cohort study have reported that coaches with experience, qualifications, and training can account for a 50% reduction injury risk (19).

Poor athlete management may lead to overtraining, development of poor training techniques, and maldevelopment of physical attributes (7, 36, 37), including the risk of developing cardiac or respiratory conditions or musculoskeletal injuries (1, 16, 20, 21). Coaches working in low socio-economic communities often have limited access to medical support (14). This results in coaches needing to have a sufficient understanding of the intrinsic and extrinsic risk factors associated with injury development. However, within low-socioeconomic communities, coaches are often recruited on a volunteer basis, resulting in a lack of adequate knowledge regarding the correct methods for coaching youth athletes.

Volunteer coaches often base their practices on their personal experiences leading to the use of incorrect or outdated sporting techniques and inadequate conditioning, and placing a greater risk of injury development on their athletes (22).

1.1.4. Role of a community coach

The TDP community coaches who work with athletes in low socio-economic areas fulfil various roles, as the full sport team complement (ordinarily consisting of a conditioning coach, physiotherapist, doctor, psychologist, and manager) simply does not exist (23). In addition, coaches are generally selected based on their willingness to coach rather than their coaching abilities, and there is no pre-requisite training needed to be employed by the MOD and TDP (24, 25). The impact of using under-qualified athletic sports coaches and volunteers within the MOD and TDP has not been evaluated. Appointment of volunteer-based coaches directly impacts young athletes. Lack of knowledge in coaching principles negatively impacts the coaches efficacy level (26-28), however, in low socio-economic communities the outcome may be worse (compared to high socio-economic communities) as the athletes living in these communities lack the accessibility to medical and rehabilitation services (29) in the event of an injury. Coaching development provides volunteer coaches with the knowledge and skill to be effective in their role.

1.2 Aims and Objectives of the Study

The overall aim of the present study was to investigate the knowledge and practices of youth athletics coaches employed by the TDP branch of the MOD program. The specific objectives were to:

1) describe the profile of coaches providing services to the MOD TDP with respect to their qualifications and experience, using an online Demographic and Coaches' Practices (D&CP) questionnaire;
2) assess coaches' knowledge regarding athlete development, injuries, practices used to reduce the risk of injuries, and the management of injuries sustained by their athletes during training or competition using an online Multiple-Choice Quiz (MCQ); and
3) assess the relation between the coaches:
    a. experience in years and MCQ score;
    b. qualification (type) and MCQ score; and
    c. qualification in first aid (yes/no) and MCQ score.

1.3 Dissertation Structure

The rationale for the present study was based on a critical review of existing literature related to community sport in SA and the role of coaches in developing youth athletes (Chapter Two). The literature review provides context and rationale for the present study's methodology, described in Chapter Three. The results of the study are presented in Chapter Four. A discussion of the results practical implications are presented in Chapter Five. Finally, an overall summary of the dissertation and conclusions are presented in Chapter Six.

CHAPTER TWO: LITERATURE REVIEW

The present review focuses on exploring and critically appraising literature available on EBSCO Host, UCT libraries, Google Scholar, and PubMed. First, the review aims to provides insight into the need for sport within low-socioeconomic communities; and describes athletics as a sport along with the physical capabilities required for participation, specifically amongst the Under (U)12-14 age group. Thereafter, published research around the role of community-based coaches will be explored. Current methods utilised in the literature to assess coach's knowledge, practices, and understanding of their role as a coach will then be identified. Finally, a broad summary of the literature will be presented, along with a section highlighting the current gaps in the field.

2.1 Introduction

Healthy adolescent development is influenced by various biopsychosocial factors. Residing in a vulnerable low-socioeconomic community may expose the youth to poverty, poor family management, low housing quality, and problematic social environments such as gangsterism and drug and alcohol abuse (30, 31). Exposure to adverse environmental conditions and the unavailability of positive extra-curricular activities at a young age increases the possibility of participating in high-risk behaviour (32) and negatively affects the child's psychological wellbeing (29, 33, 34). Within SA, youth under the age of 17 years are the most vulnerable and are considered to be at an increased risk of developing depression or participating in other high-risk behaviours from a young age (35).

Participation in sport and other physical activity may be used as an intervention to improve physical characteristics, increase psychological and cognitive functioning, enhance emotional control, improve adaptive thinking and decision-making skills, boost social intelligence, develop communication skills between peers and coaches, and reduce health risks (14, 24). Further, Haudenhyse et al. (2012), reported that participation in sports-based activities by disadvantaged youth with social and academic difficulties or those living in high-risk communities, provides a platform to develop life skills, values, and character traits that can enhance personal growth (36, 37).

2.1.1 Sport in vulnerable communities

Although sport has been recognised as a medium to provide social change among all socioeconomic groups, particularly within the younger population (33, 36, 38), sporting activities are often inaccessible for vulnerable low-socioeconomic communities. Lack of available resources, funding, appropriate training facilities, and safety concerns are a few of the hurdles that need to be overcome when creating community-based sporting programmes (29). However, assistance from government organisations has allowed sport to be used as a catalyst to uplift communities and promote social change and human development, providing an opportunity to create an inclusive community environment (29, 39).

Within SA, the Department of Sports and Recreation is responsible for creating sporting opportunities for all South Africans. Their aim is to develop and manage a framework to implement such opportunities and provide the necessary funding and support to various sporting codes (12). The inequality in sporting opportunities among population groups, as a result of apartheid, was a great concern that needed to be corrected. The department, in association with the South African Sports Commission, National Olympic Committee of SA, Disability Sport SA, SA Commonwealth Games Association, SA Student Sports Union, and the United Schools Sports Association of SA developed the National Sport and Recreation Plan (NSRP) to form a framework to address the consequences of the previous lack of equal sporting opportunity and development. In order to attain these goals, the NSRP was developed on the basis of three principles: an active nation, a winning nation, and an enabling environment (40). From this government initiative, it was recognised that for SA to become a 'winning' nation, sport needed to be available to the masses, allowing for sport development and athlete talent identification (41).

Within the WC, DCAS has initiated multiple sporting and cultural extra-curricular activities within low-socioeconomic communities, targeting youth from the age of six years old (10). The MOD programme, implemented in schools and community sporting clubs, aims to enhance personal development, develop emotional and social well-being, and promote the importance of physical activity; all while reducing youth involvement in high-risk behaviour (10).

Participating schools and community centres provide the opportunity for youth to complete the recommended 60-minutes of moderate-to-vigorous daily physical activity in multiple sporting codes (42). Introducing various sporting codes to children from a young age allows for the identification and selection of talented youth, serving as a feeder system for the TDP. The TDP allows for athletes to participate in sport-specific training sessions in preparation for competition, and creates the opportunity for youth athletes living in low-socioeconomic communities to compete at a provincial and national level (10).

2.2 Athletics

Athletics is one of the largest sporting codes both nationally and internationally, encompassing a variety of different sporting events categorised into two main classes: track and field (43). Athletes can compete in multiple events depending on their specific physical attributes and capabilities. Track events incorporate walking, running, and jumping-like activities that test the athlete's explosive power, speed, and endurance. Field events consist of events involving throwing a variety of objects, requiring greater strength (43). Combination events, such as decathlon and heptathlon combine both track and field components.

2.2.1 Athletics in South Africa

Athletics continues to grow among South Africans, as the oldest known sports competition as well as the leading sport at the Summer Olympics Games (44). The increased awareness of the sport and the success among South African athletes has made athletics a popular choice of sport for the youth.

In 1992, Athletics South Africa (ASA) was established to build a sporting structure that would introduce athletics into all South African communities. The aim of the association is to continue the growth of the sport by providing equal opportunities in athletics to all South Africans, identify talent, and raise the standard of coaching, officiating, and administration within underdeveloped and disadvantaged communities (45).

In 2018, ASA developed a strategy in accordance with the International Amateur Athletic Federation (IAAF) to facilitate growth and development for athletics (45). The strategy affirms that children between 6-10 years of age will be provided with the opportunity to partake in athletics as an extra-curricular activity. The sport is now offered at schools or community sporting clubs with an emphasis on practicing 'fun athletics' while allowing for the development of basic movement patterns (2). The ASA development strategy provides guidelines to coaches with detailed information regarding the development of an athlete. According to the ASA development strategy guideline, during these early years all activities should be considered fun and play-like yet incorporates movements that form the basis of all sport. As the child progresses, the activities should become sport-specific, requiring greater skill and more complex development of movement. Children demonstrating talent would be flagged and advised to begin specialised training, while other children continued with basic sporting programmes. Selected children would begin specialised training between 11-13 years of age. During this period, coaches would begin to develop their athletes to master general athletic skills depending on the competing code they had been streamlined to.

The selection of athletes to particular events would depend on their physical attributes, capabilities, and interests (45).

To facilitate coaching development, ASA established multiple resources providing in-depth, event-specific information regarding coaching practices and techniques to enhance and develop an athlete. In addition, these resources would provide coaches with information pertaining to the development of the human body, common injuries associated with the sport and acute management of these injuries, as well as practices enhance performance and reduce the risk of injury (46). All resources are freely available to coaches via the ASA website and has been used as the foundation for ASA coaching courses. The ASA and IAAF assert that coaches training an U12-13 age group should have completed their Level One coaching course (45), as this course provides coaches with the necessary knowledge required to provide developing athletes with the basic level of support required.

2.2.2 Sporting specialisation

Many athletes performing well in a particular discipline are encouraged to specialise and develop their skill early; however, placing an emphasis on success can pose risks to the athlete (1, 20, 47). Early specialisation in a single sport may result in underdevelopment of the physical attributes not required to complete the activity and predisposes the athlete to injury development (17, 20). High intensity training schedules with a lack of periodisation can result in cardiac concerns, musculoskeletal injury, changes to normal maturation processes, malnutrition (as athletes are often advised to change diets to enhance performance), as well as burnout (1,

20). Coaches should be aware of the risks associated with early specialisation and the effects on their athlete's future athletic abilities. The solution to these common issues is the encouragement of diverse sport participation during the developing years, allowing for holistic motor development (48).

The importance of late sport specialisation has been described by Brenner (2016) as a leading goal for athletic development (1). According to Brenner's model, there are five phases for successful athlete development (see Figure 1). The first phase, between 6-10 years of age, involves the development of the fundamentals. During this phase exercise must be fun-focused, allowing for the development of the movement skills required to partake in all athletic activities. Between 10-14 years of age, training sessions become more focused and sport specific. During this phase, the focus is the development of biomechanical capabilities and enhancement of performance abilities and should not be focused on winning or competing. For talent development initiatives this is an important phase, encouraging athlete development and teaching the fundamentals of the sport. This prepares the athlete for the following phase, which involves the introduction to competition. This phase occurs between 15-18 years of age with the focus placed on optimising performance. This protocol has been implemented across multiple sporting codes in various developed countries. The final two stages are related to adult athlete training and performance. Within the WC, the MOD initiative paired with the TDP aims to follow a similar structure to Brenner's five phase model. The initial phase of activity introduction begins in the MOD programme, while the TDP incorporates the 2nd to 5th phases.

To incorporate these guidelines, athletes require guidance by coaches, managers, and parents to provide the best opportunity to develop performance fundamentals and reduce injury risk.

Figure 1. Brenner (2016) five phase athlete development model.

2.2.3 Prevalent injuries within the U12-14 age group

Youth athletes, participating in specialised sport during their adolescent years, are at an increased risk for developing injuries (17). The risk at which injuries may develop occurs as a result of mismanagement of the athlete's training schedule and biological development (49). Youth athletes are exposed to a combination of intrinsic and extrinsic risk factors for injury(50). Two intrinsic risk factors, growth and maturation, are known to be potential risk factors that are unique to the adolescent population (50). Growth rates are increased during the adolescence growth spurt, therefore placing this population at risk for injury development. Injuries associated with developmental changes include those related to epiphyseal cartilage and growth plates such as osteochondritis, apophysitis, or epiphysitis, often presenting as inflammation (16). According to a study conducted by Wik et al. (2019), youth athletics athletes have a greater risk of bone and growth plate injuries (50). Findings from this study showed that 60% of elite youth athletes may encounter an injury resulting in restricted training and competing participation. However, injuries are often overlooked by coaches.

Athletes are often advised to rest which aids in reducing symptoms; however, the risk factors that caused the injury is often not addressed leading to recurring symptoms and overuse injuries (19).

Extrinsic risk factors such as incorrect training techniques, overtraining, lack of periodisation, and poor training environment and training apparatus are common factors that influence injury development (49). Addressing extrinsic risk factors is a simple way to reduce the stress load placed on the athlete, therefore reducing the risk of injury. Educated and experienced coaches would be able to reduce these risks and ensure adequate athlete management. Studies investigating a variety of sporting codes indicate that training loads, level of competition, and coaching experience and education level may be regarded as injury risk factors in youth athletes (19).

Unfortunately, the transition into an elite athlete status does not transpire for many elite youth athletes (51). One of the factors attributing to this is the use of inappropriate training and competition loads at a young age, leading to higher injury rates (52). An Australian study conducted by Huxley et al. (2013), examined the training loads and injuries sustained by elite youth athletics athletes (ranging from 13-17 years of age). The study identified that training intensity was a risk factor for developing overuse injuries amongst this age group, however, training duration did not have an effect on injury rate. The development of an overuse injury early in an athletes career is a major concern, as an association has been made with forced retirement (49).

Furthermore, poorly diagnosed or managed injuries early on in an athletes career can lead to long-lasting detrimental effects (49). Therefore, prevention of injury in youth sport is crucial (18).

Another interesting finding by Huxley et al (2013), was that the majority of the participating athletes were training beyond the recommended guidelines provided to coaches by the Australian Track and Field Coaches Association for youth developing athletes in both load and frequency (49).This lack of disregard for the guidelines by coaches and athletes may be due to the high competition amongst athletes to obtain elite athlete status, poor competition structures or coaches lack of knowledge regarding the impact of training on the developing athlete.

Attitudes of coaches and their athletes have been linked to the incorporation of appropriate injury prevention strategies and management protocols (53). Injury prevention by coaches consists of multiple strategies including: screening, warm-up and cool-down, physical conditioning, technique training, fair play, protective equipment usage, hydration and nutrition, injury reporting, and environment and injury management (14). Education of coaches in their role to prevent injuries is particularly important among community coaches as they are often not supported by a medical team (14).

2.3 Sports Coaching

Coaches have a strong influence on their athletes' performance, behaviour, and psychological well-being (24, 54, 55). By providing athletes with support and guidance during their developing years, coaches are able to build the strong foundation that is required when competing at a high level (25, 56).

2.3.1 Knowledge and skills in sport and training techniques

Knowledge forms one of the most important fundamentals required to be a successful coach (57). Successful coaching involves gathering vast amounts of information regarding the sport and translating it into practice. This process can occur through informal or formal learning opportunities (58). Success or failure of this process is dependent on the experience of the coaches, availability of resources, coaches knowledge and qualifications, and their relationship with the athlete (59).

Meaningful selection of training techniques and task specific exercises allows the athlete to be fully immersed within the sporting discipline, providing an opportunity for youth living in vulnerable circumstances to be relieved from their day-to-day struggles (33). Organised training sessions led by coaches are common practices across various sporting codes to develop the athlete technically, tactically, psychologically, physiologically, and physically in order to help them reach their optimal performance (60) and ensure adequate preparations for the demands of competition (61-63).

This process requires appropriate adaptation to training changes, monitoring progress, and incorporation of associated factors such as rest-recovery phases, positive psychological reinforcement, nutrition, and sleep in order to enhance the performance of the athlete (62).

2.3.1.1 Screening/Warm-up/Cool-down

The use of screening, adequate warm-up and cool-down techniques, physical conditioning and technique training, providing advice on hydration and nutrition, as well as injury reporting and monitoring are key components coaches need to understand to promote athlete development (14). The use of screening allows for coaches to assess possible areas of concern regarding injury development (64), therefore allowing for correction or seeking professional help if needed. In order to limit injury occurrence, the use of a warm-up is essential. A warm-up is used to promote muscle dynamics in order to reduce injury risk (65) and enhance performance (65-67). It enable athletes to prepare for exercise by increasing muscle and tendon suppleness, promote blood flow to the periphery, increase muscle temperature, and enhance free co-ordinated movement (68).

Traditionally, warm-up routines would be of low intensity followed by stretches and sport-specific based exercises (66). However, the use of a dynamic warm-up, lasting for at least 15-minutes (69, 70), has been recommended as an alternative to the traditional warm-up of low intensity sports-specific based exercises followed by static stretches (66).

Research has shown that practicing a high-load dynamic based warm-up has a positive effect on strength (71-73), power (74, 75), agility (76), sprinting performance (77), vertical and long jump (78), as well as flexibility (71, 72) in comparison to the use of traditional warm-up routines. The use of outdated warm-up techniques is more detrimental than beneficial. The technique of using static stretches prior to exercise can reduce maximal force production (79), may increase risk of injury development (80), and is deemed largely ineffective for performance enhancement (67, 81). However, the use of static stretching during cool-down is an important component of exercise used to improve flexibility and recover muscles.

It has been widely recognised that active cool-down is more effective in post-exercise recovery in comparison to a passive cool-down (82). Active recovery is the use of low to moderate intensity exercise while passive recovery incorporates activities that require little to no intentional movement or exercise(82). Research has shown that performing an active cool-down of low-moderate intensity exercise for 5-15min within one hour post exercise or competition is able to facilitate recovery (83-85). However, recovery interventions also include other interventions such as cryotherapy (86), compression garments (87); cold water immersion(88) and nutrition. A systematic review was conducted by van Hooren and Peake (2018) to synthesize? (determine) if active cool-down is more effective than passive cool-down. It was found that performing an active cool-down enhances performance if competing sessions are short (10-20 minutes) (89). This finding is significant in athletics due to the nature of the competition for developing athletes. However, studies researching the effects of active cool-down on next day performance varies.

Van Hooren and Peake found that selection of the type of cool-down performed; the exercise that precedes the cool-down; the experience of the athlete and the athlete's preference and believes all impact the effect of the cool-down performed (82). From the systematic review it was found that an active cool-down should incorporate the following: 1) dynamic low to moderate intensity activities to increase blood flow and prevent the development of fatigue; 2) low to moderate mechanical activity to prevent the development of muscular damage and delayed onset of muscle soreness; 3) maximum of 30-minutes to prevent interference with glycogen resynthesis; and 4) incorporate exercises that are preferred by the athlete.

2.3.1.2 Training content

Neuromuscular training is an essential component of athlete development which incorporates the use of general and specific strength and conditioning activities (90). Such programmes include resistance, dynamic stability, balance and proprioception, core strength, plyometrics, and agility-based exercises (90, 91). The implementation of such programmes among youth athletes has been found to increase motor skill capabilities, enhance motor performance, promote the athlete's ability to tolerate the demands of long-term training and competing, promote long-term health benefits, and reduce risk of injury development (92-94).

Coaches are encouraged to incorporate this training tool in order to reduce the risk of single-sport specialisation, promoting the development optimal movement strategies and skill development that will enable long-term injury resilience (95).

Implementation of strength and conditioning programmes are conducted in the pre-season for a period of six weeks (96), performed 2-3 times (97-99) per week for 30-90 minutes (95, 99), has been found to provide the benefits associated with neuromuscular training.

2.3.1.3 Training load and periodisation

Training is a process whereby an athlete enhances their technical, tactical, psychological, physiological, and physical capabilities in order to achieve their peak performance (8). However, training overload becomes an important determining factor for injury development. Training load is an important modifiable factor that should be monitored and observed by coaches among developing athletes, as it is a large influencing factor associated with increasing the risk of injury development (100). To reduce the detrimental effects of training overload, coaches need to plan and periodise their training sessions. Periodisation is a technique aimed to reduce intense overloading during training periods. It enables medium and long-term physiological gains resulting in greater physical output; while the incorporation of reduced training and tapering methods are used to reduce detrimental effects of training at high intensities for a sustained period of time (62). This intricate integration of planned training allows for coaches to have their athletes to reach optimal performance at competition. Periodisation is then used as a framework to ensure goals of endurance, strength, power, and speed are met.

2.3.2 Knowledge and skills in human development, injury, and injury management

Although experience plays a great role in understanding what is required from the athlete to perform at competitions, it is important for coaches to understand the requirements of the sport and the influence of the athlete's physiology, anatomy, and biomechanics on performance. As medical and support staff such as doctors, physiotherapists, and biokineticists are often not readily available among low-socioeconomic community teams (5), coaches need to understand their role is bigger than merely performance enhancement.

Coaches need to understand and be aware of injuries associated to the sport and the age group being coached. Although coaches are unable to make diagnoses, knowledge of signs and symptoms of common injuries will allow for early detection and necessary treatment of injuries. This would allow coaches to make informed decisions, with the assistance from medical professionals, regarding an athlete's training and competition participation (17). Early detection of conditions or injuries will result in referral to the appropriate health professional and reduce the risk of long-lasting effects. Knowledge regarding basic medical conditions or injury detection as well as the appropriate methods for referral are important, particularly within low-socioeconomic community settings (16). Coaches have the opportunity to teach safe performance techniques, promote injury prevention, and guide appropriate attitude toward injury management (18). This relies on coaches having adequate awareness and knowledge of issues related to injury and create an environment that is focused on athlete wellness rather than results.

According to a studies conducted by Ransone and Dunn-Bennet (1999) and Castro (2010), despite coaches having first aid qualifications their decision making with regards to injury management is affected by external pressures such as 'winning' (11, 101). This may lead to a reduction of quality of care provided by coaches to injured athletes.

2.3.3 Mindset and attitudes

Super et al., (2016) conducted interviews with 15 sports coaches working in socially vulnerable youth sporting clubs in the Netherlands. Eligible coaches from various sporting codes, different ages, sex and experience levels were included. Coaches experience ranged from less than two years to more than 10 years. However, all coaches worked with socially vulnerable youth participating at community-based sporting clubs or schools. Youth can be classified as socially vulnerable if they experience problems in their personal life such as learning or behavioural development or if living in an environment that is not conducive to positive development (102). The population of coaches used in Super et al.'s study is similar to that of the coaches working MOD and TDP as coaches coached athletes living in low-socioeconomic communities. Super et al (2016) conducted semi structured interviews (lasting an average of 45-minutes) with coaches varying in experience and coaching education level working within low-socioeconomic communities. The interview comprised of three sections: exploring the philosophy of sports coaches when they provide training, practises used by coaches during training sessions, and the adaption they made to working with socially vulnerable youth (102). Results showed that coaches were more performance-focused; believing that athlete upliftment was not a priority to developing a 'winning' athlete.

The study concluded that coaches instructing among vulnerable communities do not fully comprehend the extent of the impact they may have on an athletes personal and psychological development (102).

Furthermore, a study conducted by Whatman (2018) investigated coaches' and athletes' attitude to injury in New Zealand secondary school sport. Majority of participating coaches held a coaching qualification and completed their sports related first aid course (70% and 62% respectively). The study reported that despite majority of coaches having obtained a coaching qualification, 87% of coaches reported having injured players continue to compete when in a competition environment(18). It is therefore interesting to explore where coaches in the MOD TDP, who are likely to be less qualified than the New Zealand coaches, share similar values. Identification of injuries was also flagged as a concern. It was reported that despite two thirds of coaches holding coaching and first aid qualifications, coaches reported allowing athletes to continue competing while injured (18). This may be due to a lack of translating knowledge resulting in the coach's behaviour change, which is a key component for injury prevention and identification (103).

2.3.4 Coaching in community settings

Coaches involved in youth development while working in vulnerable low-socioeconomic community clubs or schools are often selected based on their interest in the sport, availability, and the ability to coach at reduced rates.

This leads to the selection of coaches with limited education, experience, and lack of knowledge pertaining to the sport and the athletes being coached (24, 25).

Coaching in vulnerable communities can be challenging, as coaches are often ill-equipped due to limited resources and funding, and in many cases are under-qualified for the role. Yet, they are expected to coach youth athletes and lead them to victories despite competing against athletes attending schools and clubs that are provided with better facilities, greater accessibility to resources, and a well-educated and experienced coaching and management staff compliment (104). Research suggests that community coaches understand the importance of athlete management and development but do not have the expertise, capabilities, or support to create structures that elicit a desired outcome (24). However, this research is not based in SA but rather in developed communities.

2.3.5 Educating and training coaches in South Africa

As youth sport has grown in SA, so too has the need for qualified coaches (105). Internationally, frameworks such as the International Sporting Coaching Framework, which is compiled by the Association of Summer Olympic International Federations, have been developed to ensure the development and standard of coaches remains high. This framework established a standardisation for the development and evaluation of coaching qualifications, the encouragement of continual coaching education and training, collaboration across international boundaries, and the formation of ethical guidelines and standardised practices (106).

According to Vargas-Tonsing (2007), a study conducted in the Southwestern United States and assessed 366 youth volunteer coaches found that the development and progression of sport is dependent on the implementation of continuous education programmes designed to fit the needs of the coach (105).

However, despite SA having created the South African National Coaching Framework (SANCF), there has been no implementation of education and development initiatives for coaches within SA (107). Little research has been conducted with regards to coaches knowledge, skills, and attitude needs with in SA (108). According to Mallett (2014), coaches working with high level athletes often gain their understanding, knowledge, and perception through on-the-job experiences, self-reflection and observation, interaction and discussion of techniques with other coaches and allied professionals, and through formal theoretical courses and resources (109).

This is further corroborated by MacDonald (2010), who found that coaches within developing communities improved their coaching capabilities through personal experience and communicating shared findings among other coaches (55). Although coaches believe continued learning is important, this requires resource availability and time, many South African coaches, particularly coaches in vulnerable low-socioeconomic communities, draw on their experience as a former athletes and on-the-job exposure as the cornerstone of their development as a coach (110).

Research regarding the South African coaches' development and training needs have yielded variable results (108, 111). Morris-Eyton and Coopoo's study (2014) reported that coaches expressed a need for further education in the analysis and correction of different techniques, strength conditioning and training, as well as ensuring safety and promoting injury prevention safety (111). The study was conducted among 120 lifesaving coaches in SA working within various socioeconomic communities. The study made use of an online survey and findings showed that participating coaches drew on their own experience, watching and conversing with other coaches, and learning on the job. Many of the coaches believed in the importance of coaching education programmes, with 54% of participants believing that this process should be mandatory (111).

While Kubayi et al. (2016), used a questionnaire to assess 1) coaches' interest in educational topics, 2) their reasons for barriers preventing them from pursuing a coaching education, and 3) perception of coaching education. The study was conducted amongst 242 SA coaches working across various socio-economic communities who were identified at coaching courses, workshops, and seminars. The questionnaire took approximately 10-15 minutes to complete. Selected coaches worked in various sporting codes, with 45 of the participating coaches working in athletics. It was reported that coaches identified wanting to obtain further knowledge in methods to motivate athletes, advance their skill in instructional drills, first aid, goal setting, and character building (108). From the research conducted among South African coaches, it can be seen that there is a gap in the literature with regard coaches working with athletes in low socio-economic communities.

Little is known about the knowledge current coaches working within these communities possess, the areas they require more development in, or the barriers they may face when needing to develop their skills as coaches.

2.4 Evaluating Coaches' Knowledge

Assessment of knowledge is often assessed through examination. This was the process used by Ransone and Dunn-Bennett (1999) and Castro (2010) to assess coaches first-aid knowledge and decision making when exposed to athletic injuries (11, 101). Castro (2010) modified the evaluation tool used by Ransone and Dunn-Bennett in order to included updated information and practices. Components of the study included: anatomy, care and treatment, prevention, assessment, equipment and heat/cold related factors (101). For both studies, a score of 80% or greater was required to pass (11, 101).

In addition to the first aid assessment both studies made use of a game situation data sheet. Participating coaches were given various situations that involved injuries during competition. Coaches had to select if the athlete is able to continue play or taken off due to the extent of the injury. This provided researchers with insight into the decision-making process coaches are faced with when in a competition environment.

Research relating to coaching in SA has been conducted regarding constraints coaches face when working in low-socioeconomic communities (108, 111). However, no research has been conducted in the field of coaches' knowledge related to injury and injury prevention within a South African low socio-economic community setting. There has also been no studies evaluating the practices used by youth athletics coaches highlighting the critical gap for future research.

2.5 Summary of Literature

Sport participation has been used as a catalyst for change among youth living in low-socioeconomic communities (39). It is the responsibility of the National Sports and Recreation Department to provide sporting opportunities for all South Africans, and correct the inequalities in sporting opportunities that have occurred as a result of Apartheid within SA (40). Within the WC, DCAS has implemented the MOD programme in schools and community sport clubs (10). The MOD programme is aimed at providing those living in low-socioeconomic communities with the opportunity to develop in several sporting codes, which allows for identification and selection of talented youths.

Potential talented athletes are recognised in the MOD and moved to the TDP for sport-specific training that will help develop potential athletes to compete at a provincial or national level (10). The MOD and TDP follows a structure found to be similar to the model researched by Brenner (2016). The five-phase model has been used and developed to assist in athlete development.

The model begins at phase one, 6-10 years of age, and involves the development of fundamental movement skills. From 10-14 years of age, children are phased into more sport-specific training which is an important phase for talent development. The third phase occurs from 14-18 years of age with the focus on optimising performance and competition (1). The need for such a structure is critical to ensure youth athletes beginning sport specialisation are well managed in order to reduce the risk of injury and increase the potential of success. If the athlete's training schedule and biological development are poorly managed, they are at an increased risk of sustaining an injury early in their careers (49).

In athletics, one of the largest sporting codes in SA, many elite youth athletes do not transition into elite senior athletes (51). One of the main contributing factors is the use of inappropriate training and competition loads at a young age leading to higher injury rates (1). To prevent this concern, athletes' needs to be managed within a well-resourced management team which include a coach, manager, physiotherapist, and biokinetisist. However, coaches coaching in under resourced, low-socioeconomic communities do not have the support of working within a team of sporting professionals. Coaching in poorly resourced communities proves to be challenging to coaches due to the lack of support and funding. Accessibility to medical support staff such as doctors, physiotherapists, and biokinetisists are not readily available(67).

Coaches have a strong influence on their athlete's performance, behaviour, and psychological well-being (24, 54, 55). Successful coaches need to be equipped with knowledge, skills and adaptive thinking, and use task-based motivation to develop and enhance their athletes' competing capabilities (24). According to Super et al. (2016), coaches working in low-socioeconomic community clubs are not sufficiently equipped with the skills required to help uplift athletes (102) and are not fully aware of their impact on their athletes personal and psychological development.

Community coaches need to understand their role is bigger than merely performance enhancement. Knowledge with regards to screening, adequate warm-up and cool-down techniques, physical conditioning and technique re-education, educating athletes on recovery techniques, and injury reporting and monitoring are key components required by coaches that do not have support staff readily available (14). Coaches need to be well-versed in these topics in order to promote physiological development and reduce injury risk (60). Despite research being conducted on coaches' knowledge on injury, injury prevention, and management of sustained injuries in developed countries, none has been conducted among South African coaches.

Research conducted by Morris-Eyton and Coopoo (2014) and Kubayi et al. (2016), focused on the coaching needs of coaches working in SA (108, 111). Results yielded from Morris-Eyton and Coopoo found that coaches seek more information with regards to technique correction, strength and conditioning, technique analysis, strength training, safety in sport, and injury prevention (111). While Kubayi et al. found that coaches wanted to gain further knowledge in methods to motivate athletes, advance their skill in instructional drills, first aid, goal setting, and character building (108). These varied responses show the need for further information gathering to help develop educational programmes for coaches. As youth sport grows in SA so does the need for well-informed, qualified coaches (105). Despite SA having created the SANCF to standardise the development and evaluation of coaching qualifications, promote continuous coaching development, and standardise practices used, very little research has been conducted on the efficacy of this initiative/framework.

CHAPTER THREE: METHODOLOGY

3.1 Study Design

A descriptive, cross-sectional study design was used. This type of study design is a cost-effective and efficient way to obtain a representative sample of athletics coaches working within the Western Cape Province MOD programme (112). This design allowed the researcher to describe the coaches in the study, their coaching practices, and obtain an understanding of injuries and associated risk factors (113). However, a cross-sectional study design may result in a response bias therefore leading to an incorrect sample representation of the tested population (112).

3.2 Participants

3.2.1 Population and sample

A sample of convenience was used. The population of coaches used were associated with the Athletics TDP included 40 coaches. All coaches (n = 40) working in the Western Cape, responsible for training and coaching U12-14 athletes within the TDP were eligible for inclusion

3.2.2 Inclusion and exclusion criteria

Inclusion criteria included athletics (track and field) coaches working in the Western Cape, responsible for training and coaching U12-14 athletes within the TDP. Exclusion criteria included coaches under 18 years of age or coaches with less than one season experience. Coaches who did not have access to a device with an internet source to complete the online components were also excluded from the study.

3.2.3 Recruitment

The researcher contacted the head of the TDP division of the Western Cape DCAS to explain the study. The WC DCAS then assisted with the identification of eligible TDP coaches, working across the WC region using a database of coaches listed with the DCAS. A recruitment advertisement (see Appendix A: Emailed Advertisement) and informed consent form (see Appendix B: Informed Consent Form) was sent via email by the researcher to the list of eligible coaches. The researcher allowed two weeks for participants to respond. Eligible participants who did not respond to the advertisement after the allocated two weeks were emailed by the researcher again to request their involvement in the study. Once 26 coaches agreed to participate, they formalised their agreement by replying to the advertisement via email and completing the consent form. The recruitment process lasted four weeks.

3.3 Measurement Instruments

Coaches were asked to complete an online Multiple-Choice Quiz (MCQ) and a Demographic and Coaching Practices (D&CP) questionnaire. These instruments were made available in English as this is the language of communication in the MOD and TDP. The MCQ and D&CP questionnaire were sent to participants separately, to spread the research burden over different sessions. Completion of both the MCQ and questionnaire required approximately 1-1.5 hours. The Google Forms platform was used to create both measurement tools and collect the data.

3.3.1 Online multiple-choice quiz

An online MCQ was designed by the researcher and administered (see Appendix D: Online Multiple-Choice Quiz (Google Form)) to assess coaches' knowledge of warm-up and cool-down strategies, athlete development, youth-based training strategies, injuries, and injury management. An electronic/online MCQ test was chosen over a paper-based one to allow participating coaches to access the test in their own respective locations. This form of testing allowed the researcher to assess a range of skills including factual and conceptual knowledge, recalling information, applying knowledge, analysing information and evaluating information (114). Benefits of using Multiple choice questions were that it allowed the researcher to assess a large group of participants as well as provide quick and efficient feedback immediately after testing. Therefore providing participating coaches with an opportunity to learn from the MCQ (115).

All questions in the MCQ were derived from information contained within resources on the ASA website (116-119). These resources form the basis for the Level 1-3 coaching examinations. The MCQ consisted of 40 questions, and each question was worth one point, with a total potential score of 40. Twelve questions were True/False type, and no negative marking was applied. Questions 1-6 focused on the coach's knowledge pertaining to warm-up and cool-down with a subtotal score of 6 points. Questions 7-13 related to questions focusing on athlete development with a subtotal score of 6 points. Questions 14-28 assessed the coach's knowledge of youth-based training practices, with a subtotal score of 15 points.

The remaining 29-40 questions focused on the coaches' knowledge of injuries and management of injured athletes, subtotalling a score of 9 points. Questions with various levels of difficulty/complexity were included.

The first draft of the MCQ was evaluated for face validity by two experts in the field of coaching education and development (DM and AL). Both experts are on the coaching professional body in SA assisting in the regulation of coaches in the WC and SA. The experts were asked to complete the MCQ and provide their professional opinion on the structure of the MCQ, the quality of questions included, as well as the relevance of each question in relation to the role of the coach. Experts noted that coaches having completed only Level 1 of their coaching qualification may find some questions more challenging. However, those that had completed their Level 2 and 3 qualification were considered to be able to accurately answer the questions selected. One of the experts did express concern regarding the difficulty of the injuries sections with questions relating to types of injuries. However, the second expert felt that coaches should be aware of such conditions if working in athletics and specifically with developing youth. Final review and decision were made by the supervisors in accordance with the second expert (see Table 1).

Table 1. MCQ Questions that were removed or amended.

Problematic questions flagged by experts	Adaptations made
Name 3 external stressors that can influence an athlete's performance.	Changed the wording of the question. Made it multiple choice – providing the coaches with options to select from. *Which of the following is NOT considered an external pressure?* ☐ *Injury* ☐ *Pressure from family and friends* ☐ *Academics* ☐ *Finances*
True or false. Training ratios have an indirect influence on the increase/decrease of performance level of the athlete?	*Replaced this question with:* *"All the following are used to increase loading of the athlete in order to increase fitness and performance ability EXCEPT…?"* ☐ *Number of repetitions* ☐ *Speed of exercise performance* ☐ *Heavier weights* ☐ *Longer recovery between sets*
What is periodisation?	*Changed the wording of this question. Provided the coaches with a true/false question relating to the definition of periodisation.* *True or false. Periodisation is the systematic planning of athletic or physical training in order to achieve the best possible performance ability throughout the competing season* ☐ *True* ☐ *False*

Table 1 continued.

Provide 2 examples of an overuse and an acute injury.	*Changed the layout of this question. Provided coaches with different types of injuries and coaches had to answer if they were regarded as acute or overuse injuries.* *State if the following injuries are classified as a chronic/overuse or acute injury*

	Chronic/Overuse Injury	***Acute Injury***
34 Stress Fracture	*X*	
35 Muscle Tear		*X*
36 Tendon Rupture		*X*
37 Tendonitis	*X*	
38 Ligament strain		*X*

3.3.2 Demographic and coaching practice questionnaire

A questionnaire (see Appendix E: Demographic and Coaching Practice Questionnaire) was created by the researcher to record coaches' qualifications, experience, and their coaching practices. A breakdown of the components of the questionnaire and the rationale are listed in Table 2 below.

Table 2. Justification of items included in the online questionnaire.

Section	**Items included and rationale**
Identifying information	Coaches were asked to submit an identifying number with the MCQ and questionnaire. This was used for the researcher to cross-reference the MCQ and questionnaire.
Demographic information	Information regarding coaches age, gender, coaching part- or full-time, number of hours coaching per week, and occupation apart from coaching was included to describe the background of the participating coaches.
Coaching experience	Information regarding the coaches' years of experience, qualifications, and sporting code specialties were included to 1) providing insight into the experience level of the coach, and 2) determine whether coaching experience and qualifications were associated with knowledge of injury.
Coaching practices - general	Information gathered from this section was included to provide clarity on the current coaching practices of each coach during the pre-season, in-season, and off-season. Thus, providing the researcher with the opportunity to assess if the current practices were evidence-based and up to date with the most recent literature.
Coaching practices- Injury management	Questions relating to coaches' knowledge related to injuries and management thereof were included to provide insight into coaches' knowledge, management, and practices pertaining to injury.

Face-validity of the D&CP questionnaire was established by asking two South African athletics coaches and two sports physiotherapists that had worked with high performance athletics athletes and coaches to assess the questionnaire. Recommendation from the experts regarding additional questions were included.

Questions pertaining to knowledge development, reflection and improvement of coaching practices selected, as well as environmental constraints that coaches may be experiencing were added to the questionnaire. Thereafter, the questionnaire was tested by a computer programmer who provided advice to reduce any technical errors that participating coaches may experience. The questionnaire was made to be completed online in order for participating coaches to complete the questionnaire in their own time and location. Advantages of using this form of assessment tool allowed for efficient and economical testing over a short period of time(120). However, the challenges of using this form of assessment is the participants accessibility to internet, the design of the survey needs to be simple and user friendly and security must be ensured in order to uphold credibility and autonomy (121).

3.4 Procedure

Ethical approval was granted by the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences (FHS) at the University of Cape Town (UCT; HREC REF 554/2019; see Appendix F: Human Research Ethics Committee Ethical Approval). Permission to conduct the interviews was obtained from the director of the WC DCAS and the MOD athletics TDP division (see Appendix G: Endorsement from the WC Department of Sports and Recreation). Coaches answered a set of questions related to eligibility (Appendix C: Information Sheet). From these questions one coach was excluded from participation as he had only one year of coaching experience. Once eligible coaches were identified, informed consent forms were completed and data collection commenced. Coaches received links to two separate Google Forms – the MCQ and D&CP questionnaire.

The MCQ and D&CP Questionnaire were completed by all participants and returned to the researcher for analysis. After the completion of the quiz, participants were provided with the correct answers. Reminder emails were sent each week to the participating coaches to encourage the completion of both – the MCQ and D&CP questionnaire.

3.5 Data Management

Participants were numbered to protect their identity. Data were entered into Excel spreadsheets which were stored on a password-protected laptop and backed up onto password-protected, cloud-based storage. Informed consent sheets were stored in a separate locked cupboard so that identification could not be derived. Access to data was restricted to the researchers and supervisory team. All raw data would remain securely stored and destroyed after a period of five years.

3.6 Statistical Analysis

Statistical analysis was conducted using STATISTICA Version 13.3 (122). Normality of numerical data was evaluated using the Shapiro-Wilk Test. Numerical data is presented as mean (standard deviation (SD)) or medians with Interquartile range (IQR) and mode, as relevant. Categorical data is presented as frequencies and percentages. Correlations between MCQ score and coaches' years of experience in the discipline was determined using Spearman's correlation co-efficient. The following convention was used to interpret the strength of the correlations ≤ 0.3: weak; 0.4 - 0.5: moderate; and ≤ 0.6: strong.

The Mann Whitney U test was used to compare groups (i.e., Coaches with [group 1] and without [group 2] a coaching and first aid qualification) on test performance. The level of significance was determined at $p < 0.05$.

3.7 Ethical Considerations

The study adhered to the research ethics guidelines of the Declaration of Helsinki (World Medical 123). Autonomy was ensured by the willingness to participate after reading the informed consent sheet (see Appendix B: Informed Consent Form) and having the freedom to withdraw at any point without consequence. The informed consent sheet explained the purpose of the study, the details of the requirements for participation, and the potential risks and benefits. All data were treated with confidentiality.

Beneficence was ensured for the individual as they received the results of their tests, and the correct answers. Non-maleficence was ensured as the testing procedures was conducted safely and with respect to privacy. Justice was upheld by giving all coaches the opportunity to be screened for inclusion/exclusion for the study without bias or prejudice.

CHAPTER FOUR: RESULTS

4.1 The Sample

A contact list including the details of 40 coaches meeting the inclusion criteria was provided by the WC DCAS. Of the 40 coaches, one was excluded as he only had one year of athletics coaching experience. Twenty-seven coaches expressed interest in participating in the study. At the commencement of the data collection period, one coach withdrew from the study due to family obligations; 21 coaches completed both the online MCQ and D&CP questionnaire, while five coaches completed the online MCQ component only (see Figure 2).

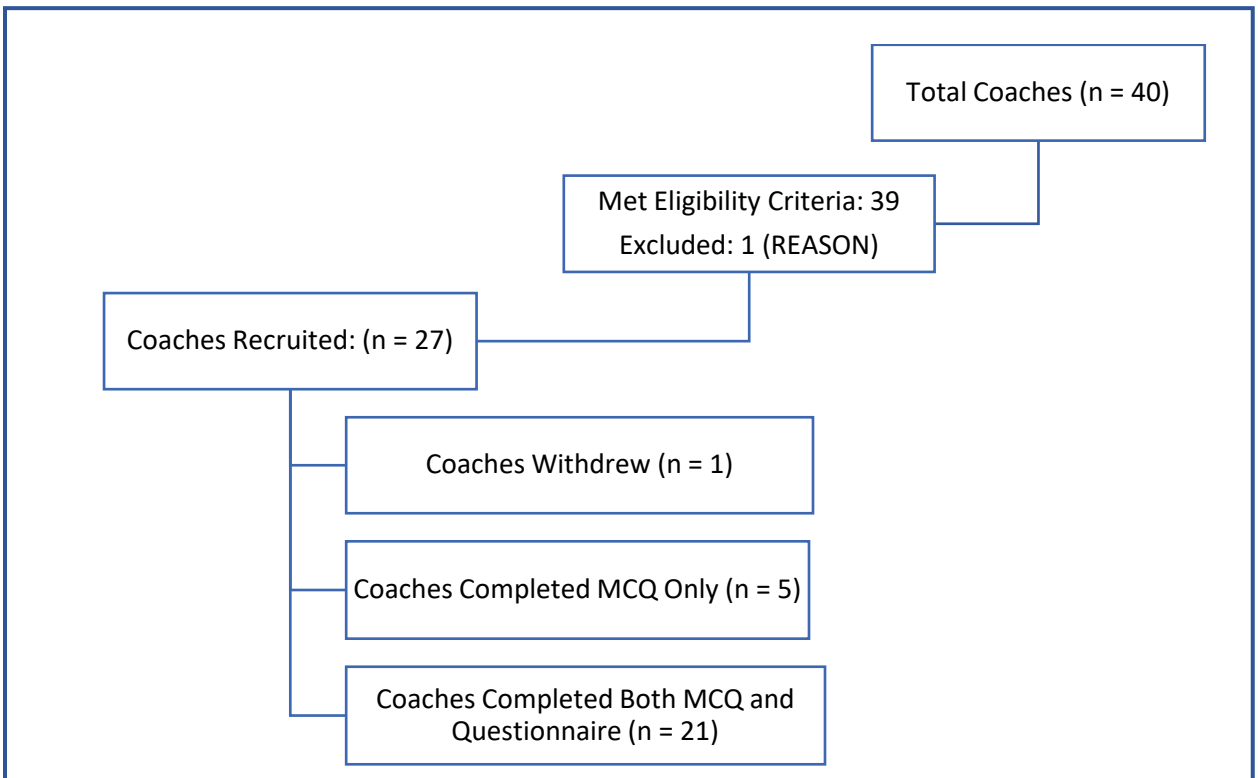

Figure 2. Flow chart representing the recruitment process.

4.1.1 Demographic and career profile of coaches

The median age of the sample who answered the D&CP Questionnaire (n = 21) was 34.0 years (IQR = 16.5; SD = 9.05; Range = 21-51 years). Seven participants were female and 14 were male. Sixteen of the 21 coaches (76.2%) held a qualification in coaching or sport from a variety of associations or institutions. Most coaches were certified by ASA (n = 12), and the remainder from Netball SA (n = 1), Sporting Community Outreach Foundation (n = 1), DCAS (n = 1) and Exercise Training College (n = 1). Among those who completed the ASA qualification, nine coaches had completed Level 1 (basic) training, three completed Level 2, and two completed Level 3. Of the 21 coaches that completed coaching courses, 12 were unable to state the year in which they completed their latest coaching qualification, one coach completed their coaching qualifications in 2008 and 2011 respectively, two completed in 2016, and the remaining five coaches completed their coaching qualification in 2018. The majority of coaches (n = 17) held a current first aid qualification.

The median length of time working as an athletics coach was seven years (IQR = 10.5; SD = 4.7; Range = 1-15 years). Thirteen coaches (n = 21; 61.9%) reported having worked for five or less years within the U12-14 age group. Reasons for coaches wanting to coach youth athletes varied. Coaches were able to select multiple options for the various reason why they have decided to coach. Their love for athletics and working among youth were selected by 17 and 16 coaches respectively (n = 21). While previous involvement within athletics as an athlete was a reason selected by 16 coaches (n = 21).

Nine participants worked as full-time coaches in the field of athletics, and 12 carried out their coaching duties part-time, in addition to their regular employment. The average time spent coaching per week was highly variable, ranging from 10-40 hours per week for full-time coaches, and between three to 48 hours per week for part-time coaches. Most coaches in the sample were coaching at school or club level (n = 14), five had experience coaching athletics athletes at provincial level, and two at national level. Participants were generally responsible for coaching between three and 30 athletes in the designated age group (U12-14), with two coaches responsible for more than 30 athletes. Participating coaches coach across multiple disciplines (as seen in Figure 3). 100m sprint (14 coaches), 200m sprint (12 coaches), 150m sprint, 400m middle distance, long jump (9 coaches), and 150m hurdles (8 coaches) were the most selected disciples of athletics participating coaches worked in.

4.2 Coaches Performance on the MCQ

The median score for the participants who completed the MCQ (n = 26) was 14/40; IQR = 4. The mode was 14 and the frequency of the mode was six (SD = 3.2; Range = 11 to 24; see Table 3). Figure 3 shows how the distribution of scores was skewed (SW-W = 0.88; p = 0.007) with most participants performing poorly with only two of the 26 coaches achieving more than 50%.

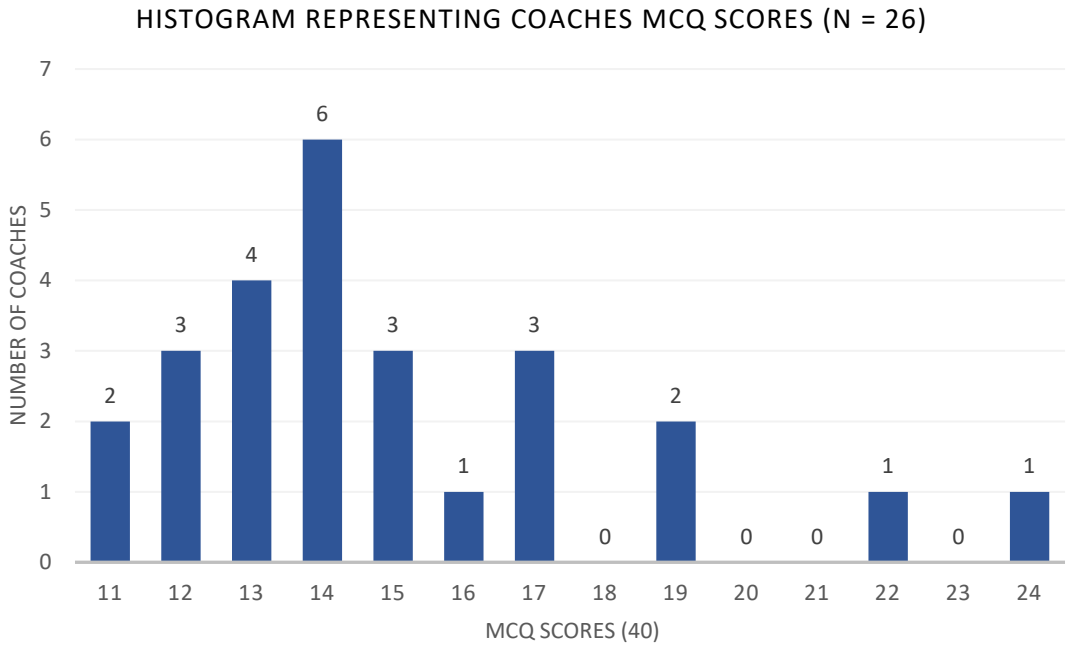

Figure 3. Histogram representing the distribution of MCQ scores achieved by coaches.

Table 3 represents the median scores achieved by coaches in the MCQ per section. The section pertaining to warm-up and cool-down was the best scored, with a median of 66.7%, while the remaining median scores achieved by coaches per section for athlete development, coaching strategies, and injury and management were 33.3%, 26.7% and 38.5% respectively.

Table 3. Mean MCQ scores achieved by coaches per section.

MCQ Sections (n = 26)	Median	%	Minimum	Maximum	IQR
Warm up and cool down section total (6)	4	66.7	2	6	1
Athlete development section total (6)	2	33.3	0	5	1
Coaching strategies section total (16)	4	26.7	1	10	2.25
Injuries and management section total (12)	5	38.5	2	7	3

4.2.1 Coaches knowledge on warm-up and cool-down

Table 4 represents the questions used in Section A of the online MCQ, the correct answer per question, and the participating coach's response variability per question. An important question relating to components of warm-up (Q2) showed that 81.8% of coaches answered incorrectly. Only 19.2% of coaches were able to acknowledge that static stretches are not a component of a warm-up. All coaches were aware of the relationship between warm-up and injury development (Q4, 100% correct).

Table 4. MCQ Section A questions, answers, and coaches' response variability.

Question Number	Question	Options *Correct	Responses % Correct Bold (n = 26)
1	*True or False. The warm-up must be performed for at least 30 minutes before having to compete.*	A. True B. False *	A. 69.28 B. **30.8**
2	*Which of the following is NOT a component of a warm-up?*	A. Dynamic Stretches B. Sprints C. Static Stretches * D. Muscle Activation E. Agility Skill-Based Training	A. 3.8 B. 30.8 C. **19.2** D. 19.2 E. 26.9
3	*Which of the following is NOT an advantage of warming- up/cooling-down?*	A. Warm up exercises improve blood circulation and enables oxygen to reach muscles faster while training/ competing B. Cooling down exercises allows the body more time to remove waste materials C. Rate of recovery is not dependent on the amount of time spent cooling down * D. Inadequate warm up places greater risk of developing a muscle or tendon injury	A. 0 B. 7.7 C. **34.6** D. 57.7
4	*True or False. Warm-up reduces the risk of injury development.*	A. True * B. False	A. **100** B. 0
5	*True or False. Track athletes should have more cardiovascular based warm-up drills, while field athletes should have more muscle activation-based drills (bridging, crab walks, push-ups etc.)*	A. True * B. False	A. **84.6** B. 15.4
6	*True or False. On hot days, the body temperature is high, therefore athletes do not need to warm-up.*	A. True B. False*	A. 3.8 B. **96.2**

4.2.2 Coaches knowledge on athlete development

Questions relating to puberty and athlete development demonstrated that 70% of coaches believed that during the developing years an athlete's musculoskeletal system develops faster than that of the skeletal system, leading to an increase risk of injury development. The majority of coaches (69.2%) did not regard the developing years as the 'golden age' for the development of sporting capabilities. However, it was also found that 73.1% of coaches felt that early specialisation into a sport increased the athlete's potential of becoming an elite athlete (see Table 5).

4.2.3 Coaches knowledge of youth-based training practices

The average score for Section C of the MCQ was 16.7%, with scores ranging from 1-11 points scored out of a possible 15. Questions related to training strategies for developing athletes showed that more than 70% of participating coaches believed that training goals should be externally driven. 69.2% of coaches believed that during the developing years training should be closely monitored, with the emphasis on the overall ability to win competitions. Questions related to periodisation - a technique used to ensure athletes reach optimal performance at specific times during their competing season - showed that 80.8% of coaches believed periodisation allowed for athletes to maintain peak performance throughout the competing season. Macro- and meso-cycles are used by coaches to achieve training and competing goals. 50.0% of coaches were able to correctly identify the duration of a macro-cycle as over a 12-month cycle. However, Q27 showed that 53.8% of coaches believed that implementation of meso- and macro-cycles can occur from an U12 age group.

Q19 related to recovery and the effects of sleep on the athlete's ability to recover post training or competition. 50% of coaches were able to correctly identify that athletes required 7-8 hours of sleep per night to gain the associated recovery benefit (see Table 6).

Table 5. MCQ Section B questions, answers, and coaches' response variability.

Question Number	***Question***	**Options *correct**	**Responses % Correct (n = 26)**
7	*At what age does puberty start amongst boys and girls respectively?*	A. Ages 11-14 years in girls and 10-13 years in boys* B. Ages 11-14 years in boys and 10-13 years in girls C. Ages 11-14 years in both boys and girls D. Ages 10-13 years in both boys and girls	A. **19.2** B. 42.3 C. 7.7 D. 30.8
8	*What is the most commonly injured structure to be concerned about when coaching athletes of the u12-14 age group?*	A. Bone B. Ligament C. Tendon D. Growth plate* E. Muscle	A. 15.4 B. 26.9 C. 3.8 D. **26.9** E. 26.9
9	*True or False. During puberty the musculoskeletal system develops faster than the skeletal system thus increasing the risk of injury.*	A. True B. False*	A. 69.2 B. **30.8**
10	*True or False. Early specialisation in sport increases the athlete's potential of becoming an elite athlete.*	A. True B. False*	A. 73.1 B. **26.9**
11	*Which of the following is not used to determine the maturity level of the athlete?*	A. Physical Development B. Psychological/ Emotional development C. Previous exposure D. Chronological age * E. All of the above	A. 0 B. 3.8 C. 11.5 D. **53.8** E. 30.8
12	*True or False. Puberty is known as the golden age for skill development.*	A. True* B. False	A. **30.8** B. 69.2

Table 6. MCQ Section C questions, answers, and coaches' response variability.

Question Number	*Question*	Options *correct.	Responses % Correct (n = 26)
13	*True or False. In the u12-14 age group weight training must be incorporated into the strength and conditioning component of training?*	A. True B. False*	A. 53.8 B. **46.2**
14	*True or False. During the developing years of an athlete; training should be closely monitored with emphasis on strength building, endurance and overall ability to win competitions.*	A. True B. False*	A. 69.2 B. **30.8**
15	*Which of the following is NOT considered an external pressure?*	A. Injury* B. Pressure from family C. Academics D. Finances	A. **46.2** B. 7.7 C. 15.4 D. 30.8
16	*True or False. Training goals should be externally driven in order to achieve excellence.*	A. True B. False*	A. 73.1 B. **26.9**
17	*All of the following are used to increase loading of the athlete in order to increase fitness and performance ability EXCEPT?*	A. Number of repetitions B. Speed of exercise performance C. Heavier weights D. Long recovery between sets*	A. 15.4 B. 11.5 C. 57.7 D. **15.4**
18	*Which of the following factors do NOT have an impact on training adaptations?*	A. Gender B. Chronological age* C. Training age D. Psychological age	A. 53.8 B. **19.2** C. 7.7 D. 19.2
19	*What is the recommended amount of sleep for an adolescent needed to allow for adequate recovery?*	A. 5-6 hours/night B. 6-7 hours/night C. 7-8 hours/night* D. 8-9 hours/night	A. 3.8 B. 7.7 C. **50** D. 38.5
20	*Which of the following are considered components of exercise?*	A. 1 Speed B. 2 Endurance C. 3 Flexibility D. 4 Strength E. 5 Proprioception & Balance F. Option 1,2 & 5 G. Option 1-4* H. All of the above	A. 3.8 B. 0 C. 0 D. 0 E. 0 F. 11.5 G. **11.5** H. 73.1

Table 6 continued.

Question Number	*Question*	Options *correct	Responses % Correct (n = 26)
21	*Which of the following is NOT a characteristic of an anaerobic endurance exercise?*	A. Intensity: 90-100% B. Duration: 10sec -1 min C. Distance: 80-400m* D. Repetition: 1-5 E. Recovery between repetitions: 1-3 min	A. 15.4 B. 15.4 C. **34.6** D. 11.5 E. 23.1
22	*Which of the following is NOT classified as strength training?*	A. Ballistic strength* B. Endurance strength C. Maximum strength D. Elastic strength	A. **34.6** B. 26.9 C. 15.4 D. 23.1
23	*True or false. Periodisation is the systematic planning of athletic or physical training in order to achieve the best possible performance ability throughout the competing season.*	A. True B. False*	A. 80.8 B. **19.2**
24	*Which of the following is NOT an outcome of periodisation?*	A. To improve their performance times with each training session B. To optimise the improvement of performance C. To peak at the right time D. To reduce the risk of injury*	A. 38.5 B. 3.8 C. 19.2 D. **38.5**
25	*What is the time period considered for a single macro cycle when planning a training programme?*	A. 1-3 months B. 4-6 months C. 1-6 months D. 12 months*	A. 23.1 B. 11.5 C. 15.4 D. **50**
26	*Which of the following are NOT identified as components of a mesocycle?*	A. Preparation cycle B. Competition cycle C. Peak cycle D. Recovery cycle* E. Transition cycle	A. 15.4 B. 19.2 C. 23.1 D. **26.9** E. 15.4
27	*At which age should periodisation be implemented into the athlete's training regime using macrocycles and mesocycles?*	A. U12 B. U13 C. U14* D. All of the above	A. 15.4 B. 3.8 C. **26.9** D. 53.8

4.2.4 Coaches knowledge of injuries and management of injured athletes

Five of the 26 coaches (19.2%) were able to correctly identify that athletes are most at risk of developing an injury toward the end of the competing season and during the pre-season, while most coaches (53.8%) felt that athletes are always at risk of injury throughout the season. An average of 50% of coaches were able to correctly classify common athletics injuries according to acute versus overuse. More than 50% of coaches were unable to correctly identify signs and symptoms commonly associated with injuries related to the developing athlete. The response variability in Q30 was extremely varied with 30.8%, 19.2% and 15.4% of coaches believing that it is the responsibility of the physiotherapist, doctor and physiotherapist, or doctor only to decide the return to competition of an injured athlete respectively (see Table 7). The remaining coaches believed that the coach, athlete, and parent also had an influence on the decision for an athlete to return to competition.

Table 7. MCQ Section D questions, answers, and coaches' response variability.

Question Number	*Question*	Options *correct	Response % correct bold (n = 26)
28	*When is the athlete most at risk for developing an injury?*	A. Beginning of the competing season	A. 3.8
		B. During the middle phase of the competing season	B. 7.7
		C. During pre-season	C. 11.5
		D. Option 2 & 4 only*	D. **19.2**
		E. All of the above	E. 53.8
29	*What is the best method for acute management of a musculoskeletal injuries sustained during training/competition?*	A. Rest – Ice – Compression – Elevation	A. 26.9
		B. Rest - Ice - Compression – Elevation – Protection*	B. **26.9**
		C. Ice - Rest	C. 7.7
		D. Refer to health professional immediately	D. 34.6
		E. Rest until the athlete feels better	E. 3.8
30	*Who is responsible for deciding when an injured athlete is able to return to play?*	A. Doctor	A. 15.4
		B. Physiotherapist	B. 30.8
		C. Doctor and Physiotherapist*	C. **19.2**
		D. Doctor, physiotherapist, coach and athlete	D. 7.7
		E. Doctor, physiotherapist and coach	E. 11.5
		F. Doctor, physiotherapist and parent	F. 3.8
		G. Coach and first aid medical officer	G. 3.8
		H. All of the above	H. 7.7
31	*Sever's disease (pain in the heel as a result of growth plates being affected) is a common injury amongst track athletes. Select the signs and symptoms associated with this condition.*	A. Can occur in both heels simultaneously	A. 3.8
		B. Pain with palpation of the heel	B. 65.4
		C. Symptoms most likely to develop towards the end of a season*	C. **3.8**
		D. Walking or running on tip-toes	D. 26.9

Table 7 continued.

Question Number	*Question*	Options *correct	Response % correct bold (n = 26)
32	*Osgood Schlatter disease (inflammation/irritation of the attachment of the patella tendon on the shin) is another common injury to the knee associated with the u12-15 age group. Select the signs and symptom that is LEAST associated with this condition.*	A. Constant or intermittent pain in the knee B. Pain with bending the knee C. Swelling can extend down into the shin D. Symptoms increase with high impact actions E. Knee feels cold to touch*	A. 19.2 B. 7.7 C. 15.4 D. 15.4 E. **42.3**
33	*True or False. A tendon attaches bone to bone while ligament attaches muscle to bone.*	A. True B. False*	A. 69.2 B. **30.8**
	State if the following injuries are classified as chronic/overuse of acute		
34	*Stress Fracture*	A. Acute injury B. Overuse/Chronic Injury*	A. **34.6** B. 65.4
35	*Muscle Tear*	A. Acute Injury* B. Overuse/Chronic injury	A. **57.7** B. 42.3
36	*Tendon Rupture*	A. Acute Injury* B. Overuse/Chronic injury	A. **57.7** B. 42.3
37	*Tendinitis*	A. Acute injury B. Overuse/Chronic Injury*	A. 46.2 B. **53.8**
38	*Ligament Sprain*	A. Acute Injury* B. Overuse/Chronic injury	A. **53.8** B. 46.2
39	*The signs and symptoms associated with a stress fracture include all of the following EXCEPT?*	A. Deep dull ache type pain B. Inability to weight bear on injured limb* C. Swelling D. Pain occurs during or after activity	A. 26.9 B. **15.4** C. 30.8 D. 26.9
40	*If the athlete has flu-like symptoms and are placed on antibiotics at what stage is he/she able to start training?*	A. No training until all symptoms clear B. Training can begin 48 hours after antibiotics has been started and athlete is symptom-free	A. 80.8 B. **19.2**

4.3 Coaching Practices

4.3.1 Coaching practices during pre-season

Data revealed that 19 of the 21 coaches (90.4%) incorporated a pre-season conditioning programme, lasting on average 7.5 weeks (Range = 3-16 weeks), to prepare athletes for the upcoming competing season. A majority of coaches (57.14%) selected an average duration of typical pre-season training to be 61-90 minutes per session (see Table 7). Components of physical fitness training used by the 19 coaches that made use of a preseason training programme can be seen in Table 8. Incorporation of flexibility (68.4%), strengthening (84.2%), aerobic training (89.5%), anaerobic training (73.7%), neuromotor training (42.1%), and technique training (52.6%) was used within the preseason training programme. Results showed that conditioning programmes were designed by either the coach (26.9%), conditioning coach (30.8%), or biokineticist (3.8%).

Table 8. Duration of each training session during pre-season.

Category	**Count**	**Percent of Valid**
30-45 min/session	2	9.52381
46-60 min/session	6	28.57143
61-90 min/session	12	57.14286
90+ min/session	1	4.76190
Missing	5	23.80952

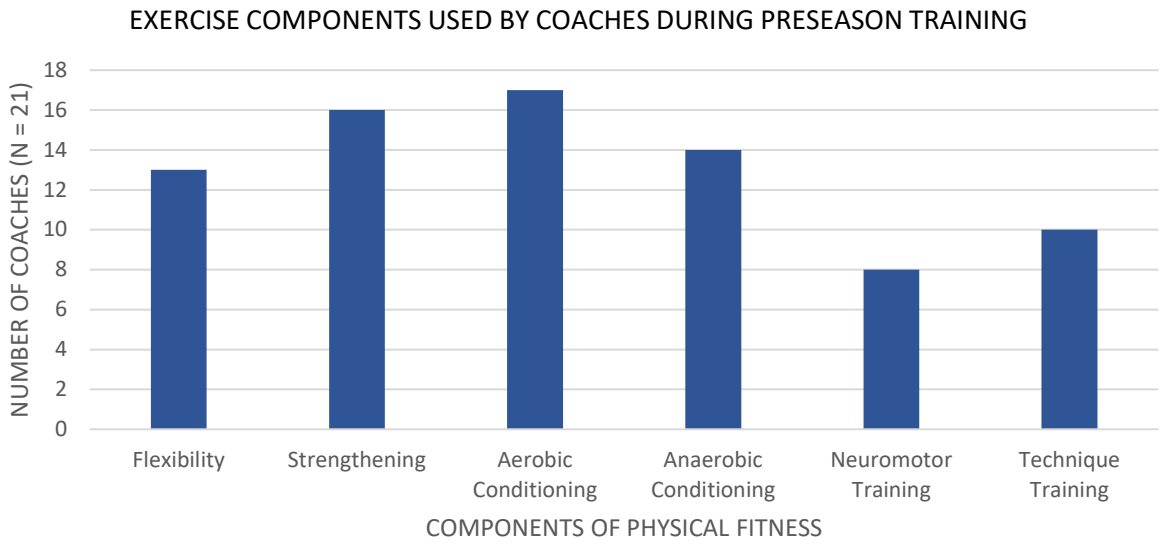

Figure 4. Histogram representing the components of exercise used by coaching in their pre-season conditioning programme.

4.3.2 Coaching practices during competition

The average number of competitions per season varied between 2-10 competitions (Md = 9.14; SD = 21; Mode = 7). During the competition phase of the season, 15 coaches focused on a combination of technique development training and maintenance of conditioning, while six coaches only incorporated technique development training only (see Figure 5; five missing responses). Breakdown of a typical training session shows the incorporation of a warm-up (Mo = 10-15 minutes; 38.5%), rehabilitation (Mo = 5-10 minutes; 34.6%), aerobic training (Mo = 10-15 minutes; 26.9%), anaerobic training (Mo = 10-15 minute;, 19.2%), strength-based training (Mo = 15-20 minutes; 23.1%), neuromotor training (Mo = 5-10 minutes; 23.1%), technique specific re-education (Mo = 20-25 minutes; 19.2%), flexibility (Mo = 5-10 minutes; 42.3%), and cool-down (Mo = 5-10 minutes; 57.7%). Variation in times used per component may occur as a result of the varied disciplines of athletics coaches need to coach to their athletes.

4.3.3 Coaching practices during off-season

61.5% of coaches made use of an off-season training programme that athletes needed to complete. Off-season programmes were mostly created by the coach (26.9%), conditioning coach (30.8%), or biokineticist (3.8%). All coaches educated their athletes on specific practices that they should follow prior to competition (e.g., diet advice, injury prevention, sleep, training load etc.). Table 9 represents the recovery strategies participating coaches focused on prior to competition. Rest and encouraging sufficient sleep were the two most commonly used practices to help prepare athletes for competition, with 76.2% of coaches making use of this technique. Questions relating to training load showed a varied response.

Eight coaches increased training load but reduce intensity before competing, seven coaches increased training load and intensity prior to competition, while eight coaches believed in tapering the training load but maintain intensity of training in preparation for competing.

Table 9. Recovery strategies implemented prior to competition.

Sporting Education	**Coaches (n = 21)**
Rest	16
Encourage sufficient sleep	16
Change in liquid intake	15
Change in diet – encouraging players to eat more carbohydrates	8
Tapering of training load but keeping intensity of training	8
Increase training load but reduced intensity	8
Increased training load and increase intensity	7
Tapering with reduction in intensity of training	5

4.4.4 Coaching practices related to warm up-and cool-down

Warm-up, a common practice used by coaches and athletes, was found to be used by all participating coaches. Time spent on warm-up varied between preparing for a standard preseason/training session, versus preparing for competition. Seventeen coaches (n = 21; 89.95%) spent up to 15 minutes during normal training sessions; however, some spent up to 30 minutes in a competition setting (see Table 10). Seventeen of the coaches indicated that it was their responsibility to warm up their athletes when in competition, while the remaining four coaches indicated that the athletes themselves were responsible for their own warm up prior to each event.

Table 10. Time spent on warming-up athletes during training vs competition reported by coaches.

Time (minutes; n = 21)	Preseason	Competition
No warm-up	0	0
1-15	17	7
16-30	3	8
31-45	1	3
46-60	0	3

Table 11 reports the components implemented during warm-up. Dynamic stretches was the most commonly used technique with 19 coaches using this within their warm-up. Training based exercises were only used in the warm-up when athletes were preparing in a competition setting.

Table 11. Representing the different components used by coaches within the warm-up during preseason vs competition.

Exercise Components (n = 21)	Preseason	Competition
Aerobic-based exercises	17	20
Dynamic Stretches	19	21
Static Stretches	11	13
Anaerobic-based exercises	10	11
Agility	12	8
Resistance and strength-based exercises	9	6
Ballistic exercises	12	4
Balance and proprioception-based exercises	7	9
Technique based training	0	10

Table 12. Time spent on cooling-down athletes during preseason vs competition.

Time (minutes)	Preseason	Competition
No cool-down	0	1
1-15	18	15
16-30	2	5
31-45	1	0
46-60	0	0

With respect to cool down, 19 coaches indicated they included cool downs after competing in an event. Thirteen coaches were involved with cool-down themselves, either after an event or at the end of a competition. As with warm-ups, seven coaches indicated that the athlete themselves were responsible for their own cool-down. Most coaches included less than 15 minutes of cool-down and five coaches had cool-downs with a duration of between 15-30 minutes (see Table 12). Most cool downs were encouraged after each event (by 17 coaches), while one coach allowed for cool downs at the end of the competition. All coaches used aerobic based exercises within their cool-downs. However, from the findings it was seen that only one coach incorporated agility-based exercises and resistance-based exercises, and two coaches included ballistic and balance type exercises into their cool-downs (see Table 13).

Table 13. Exercise components used by coaches in cool-down.

Exercise Components (n = 21)	**Coaches**
Static Stretches	18
Aerobic-based exercises	14
Dynamic Stretches	7
Balance and proprioception-based exercises	6
Anaerobic-based exercises	3
Resistance and strength-based exercises	2
Ballistic exercises	2
Agility	1
Technique based training	1

4.4 Coaching Practices regarding Injury Management

81% (17/21) of participating coaches held a first aid qualification with majority having completed Level One. Time since completion of their first aid qualification ranged from 1 year (n = 7), 2 years (n = 7), to 3 years (n = 3). Ten coaches (47.6%) completed preseason testing on each of their athletes. This process included taking an injury history, receiving insight into the athlete's growth development, and assessing the athletes' posture, strength, flexibility, cardiovascular fitness, and technique.

Coaches in the sample managed minor and severe injuries sustained during training. 19% of coaches had assistance from first aiders present at each training session. The remaining coaches stated that they would be first to assess the state of the athlete's injury before referring to a medical professional if required. Ice (18/21), compression (12/21) and elevation (11/21), using protection (11/21), or referral to a medical professional (15/21) were the four main management methods for acute injuries sustained during a training session. Five coaches reported using medication when managing an injured athlete. During competitions, acute management was slightly different with the following techniques more commonly used: ice (14/21), compression (6/21), elevation (5/21), protection (6/21), refer to a medical professional (19/21), or encouraging athletes to use medication (3/21) to reduce symptoms caused by the injury.

In many cases the coaches were the only source of medical assistance at a training session. Eight coaches believed that youth athletes experiencing pain would be considered normal. Only one coach revealed that they did not allow athletes to stop training when presenting with pain during a training session. For injured athletes, 12 (57%) of the coaches did not encourage any training until the injury completely healed; while the remaining nine coaches practice alternative training techniques to keep the athlete involved during the training season. Those who use alternative training for injured athletes incorporated the use of the following techniques: active rest (15/21), strengthening (11/21), stretching (13/21), resistance training (1/21), and technical re-training (5/21).

Questions related to the decision to return an athlete to competition found that 61.5% of the coaches depended on a medical professional to provide clarity on the athletes return to competing (16/21); while the remaining 38.5% of coaches believed that it would be either the coach or parents' choice (3/21). Four of the participating coaches reported that they had compromised an injured athlete's healing period in order to allow the athlete to compete. However, 69.2% of coaches believed in a gradual return (18/21) to competition approach for all competing athletes.

4.5 Relationships between MCQ Scores and Coaching Profile

A Spearman's correlation coefficient was computed to assess the relationship between coaches' years of experience within their current discipline and the score on the MCQ test. A positive correlation, trending towards significance was returned ($r = 0.43$; $n = 21$; $p = 0.054$).

4.5.1 Coaching qualifications and MCQ scores

Five of the coaches did not have any form of coaching qualification. The Mann Whitney U test revealed the difference in scores between the two groups (Group 1 rank sum (obtained coaching qualification) = 179; Group 2 rank sum (no coaching qualification) = 52) was not significant ($U = 37$; $z = 0.21$; $p = 0.83$).

4.5.2 First aid qualification and MCQ scores for Section Four: Injuries and management

The scores obtained in Section 4 of the MCQ related directly to knowledge pertaining to athletics injuries and the developing athlete. The highest score recorded was seven correct answers out of a possible 13 which was obtained by a coach with a Level 1 first aid qualification. The Mann Whitney U test revealed the difference in scores between the two groups (Group 1 rank sum (obtained first aid qualification) = 199; Group 2 rank sum (no first aid qualification) = 32) was not significant ($U = 22$; $z = 1$; $p = 0.3$).

CHAPTER FIVE: DISCUSSION

5.1 Summary of Main Findings

The present study was conducted to gain further insight into TDP U12-14 athletics coaches' knowledge and practice pertaining techniques used to reduce the risk of injury development, athlete development, injury, and injury management. The 21 participating coaches consisted of seven female and 14 male coaches working in schools or sporting community clubs, associated with WC DCAS athletics TDP. The main findings of the study revealed that the participating coaches scored poorly on the MCQ, with an average score of 37.5%. 76% of the coaches held a coaching qualification varying from Level One to Three, of which 57% completed courses specific to athletics. Coaches score on the MCQ were associated with certification in coaching. A large variation in experience between participating coaches was reported (ranging from 5 to more than 25 years). However, only five coaches had more than 10 years' experience working within the U12-U14 age group. The only participating coach with more than 20 years' experience scored within the top percentile of the MCQ. However, those scoring in the lower percentile had experience ranging from less than 10 years up to 20 years of experience.

5.2.1 Coaching education and experience

Our findings revealed that 76% of the coaches obtained their coaching qualification, ranging from Level One to Three. 43% had completed their coaching Level One within the field of athletics through ASA while the remaining 33% completed general coaching revealing a gap in coaching accreditation.

The professionalisation of coaching has grown exponentially over the past several decades resulting in an increase in the importance of coaching development initiatives (124). In many developed countries, the profession requires formal training, licensing, and certification (58). However, within SA formalised coaching development and education remains poor in many sporting codes. The South African Government in association with the South African Confederation and Olympic Committee (SASCOC) developed the SANCF. This initiative was created to establish coaching criteria, develop strategies, and promote the profession of coaching (108). According to Kubayi et al. (2016), the implementation of such strategies were only made compulsory by SASCOC and SANCF during November 2019 (125). Prior to 2019 there had been no established national framework for education and development of coaches within SA (107).

Coaching efficacy is influenced by education and experience (28). Five coaches in the present study did not have any formal training in the field of sport; however, each of them competed as an athlete themselves and used this experience to support their athletes. Although this improved their ability to connect with their athletes, the coach is limited in the knowledge related to biomechanical requirements and injuries associated with the sport. This lack of knowledge could reflect in poor athlete management and welfare, leading to over-trained athletes, increased risk of injury, mismanagement of injuries, and no return-to-play protocols.

Enhancing coaches knowledge will increase their efficacy and allow coaches to become more effective, and their athletes more successful (26). In a study conducted in Malaysia, a developing nation, Mea and Kassim (2018) assessed the impact of coaching education and experience on coaching efficacy. The study reported that the majority of participants had obtained a beginner level sports specific coaching qualification; which could be considered as the equivalent to a level one ASA coaching qualification. The results from Mea and Kassim (2018) showed that coaching experience and education level can be considered a predictor of coaching efficacy (26). Their findings showed that amongst the 331 coaches, a medium positive correlation was amongst between coaching experience and coaching efficacy (r=0.37), while a small positive corelation was made between coaching education and coaching efficacy (r=0.12). This has been corroborated with multiple studies, showing that coaches that have completed coaching education courses in comparison to short courses or no education will result in greater performance outcomes (27, 28). An additional study conducted by Kee and Raja (2015) also reported that coaches with more experience would possess a higher level of coaching efficacy (126). From their study, results indicated that experienced coaches were more competent in the planning, evaluation, management, and training of their athletes. These findings were reflected in the present study as a moderate positive correlation between MCQ scores and number of years' experience was found (r = 0.43).

However, formal learning has been found to have its own limitations. According to Mallet et al. (2009), formal learning lacks scientific support, feedback and innovation, and runs the risk adapting knowledge and practices to the latest evidence-based research (127).

Many of the formal and informal coaching development sources focus on theory-based learning rather than practical implementation, lack a holistic approach to coaching, cover large amounts of information in a short period of time, and limit the ability for coaches to adapt and individualise their coaching styles (128, 129). Due to the lack of research in the field of coaching knowledge and practices among South African coaches, the needs of South African coaches remains anecdotal (130). Participating coaches in the present study believed that coaching development was an important aspect for growth as a coach. Coaching workshops and discussion with other coaches were the two most selected methods of coaching development among the participating coaches.

The need to develop future South African athletes has provided employment opportunities for coaches and managers particularly among vulnerable low-income communities. However, recruitment and employment of coaches is dependent on the availability of funding and resources of the school/club. Coaches working in more affluent schools/community sporting clubs are often employed based on their level of education, experience, and personal attributes. Whereas coaches in low-socioeconomic communities often volunteer for the position due to lack of funding, rather than being selected based on coaching qualification or experience. These coaches often require further development and support to expand on their coaching skills and knowledge. The involvement of an underqualified coach will place the athlete under potential risk of injury development and reduce the longevity of their competing career (private conversation with Igsaan Sectar, Athletics hurdles coach in the TDP, 16/12/2018).

5.3 Coaches Knowledge and Practices

5.3.1 Coaches knowledge regarding athlete development

Only 31.8% of participating coaches in the present study correctly identified the benefits and risks associated with coaching athletes during their developing years. A common misconception persists regarding effect of early specialisation on developing a potential competing career (20, 21). The belief that early specialisation results in 'elite' competing status is most often perpetuated and encouraged by both the coach and parent (21). This finding persisted in the present study, with 73.1% of participating coaches reporting that early specialisation in sport would increase the athlete's potential for becoming an elite athlete. This can be correlated with Super et al. (2016) study whereby coaches were performance driven with emphasis not being placed on athlete development and longevity (102). Evidence has shown that single sport specialisation increases the risk of injury and the development of overuse injuries amongst youth athletes (17, 21).

Questions presented in the MCQ relating to athlete development was the lowest scoring section, with the average score achieved by participating coaches being 16.7%. Management of training load, intensity, and injury risk must be taken into consideration with young developing athletes (17, 21). Coaches should be made aware of the effects their training regime on their athletes, identify athletes that are undergoing puberty and growth changes, as well as recognise signs and symptoms associated with the development of injuries associated with growth changes and overuse.

ASA provides all coaches with free online coaching manuals that provides insight into the process of coaching and developing an athlete. Results from the MCQ show that despite easy accessibility to these modules, coaches do not make use of them. It can therefore be noted that adherence to continual coaching development is not being monitored by ASA or their respective unions. Compliance monitoring of coaching education and development, performance reviews, and career development plans should be implemented in order to enhance and improve coach's knowledge.

5.3.2 Coaches knowledge and practice regarding warm-up and cool-down

Warm-up prior to the start of exercise is a commonly used practice by coaches in order to adequately prepare their athletes to attain optimal performance during competition (73) and prevent injury (65, 67, 131). Therefore, it was pleasing to note that all participating coaches included a warm-up component in their training and competition regimen. 89.9% of the participating coaches spent up to 15-minutes completing their warm-ups during the training season. This finding is consistent the American College of Sports Science guidelines which states that warm-up and cool-downs should performed for a minimum of 5-10 minutes (70)

According to the present study's findings, coaches incorporated various exercise components into their warm-up routine in order to effectively prepare their athletes for exercise. Aerobic (80.9%) and anaerobic (47.6%) based exercises, agility and ballistic exercises (57.1%), dynamic stretched (90.5%), and static stretches (52.4%) were the various components used by coaches.

This demonstrated that the majority of coaches incorporated exercise components that aligned with the research to provide athletes with the benefits associated with an adequate dynamic warm-up (71-76, 78, 132). However, it is concerning that no sport specific motor-pattern based exercises had been incorporated into training-based warm-ups but only in competition-based warm-ups.

Research has reported that the best use of dynamic stretches is before exercise, while the incorporation of static stretches is more appropriately used after training (66, 133). Within the present study, 42.3% of coaches still use static stretches within their warm-ups. Despite this technique having been the preferred method of warm up it is concerned to be an outdated (80). Research has since demonstrated that static stretches are largely ineffective for performance enhancement (67, 81) and may even increase the risk of injury development when used prior to exercise (80). From the present study, the researchers are unable to determine why coaches were continuing to use this mode of stretches within their warm-ups. It is not suggested that this mode of stretching is inappropriate, as one hypothesis states that static stretches can be used as a tool to increase range for athletes with reduced joint range of movement, reduce muscle tension, and reduce the risk of muscle and tendon injuries (134). However, obtaining the benefits from this from of stretching is not effective when used in preparation for exercise (135). This statement is reflected in the information provided to coaches within the ASA coaching resources. The ASA warm-up and stretching resource states that dynamic stretches are best used before training, while static stretches should be applied after exercise (119).

From the findings of the present study, it can be noted that coaches understand and are aware of the importance of warm-ups, as it was the most correctly answered section in the MCQ. However, 42.3% continue to use older techniques such as static stretches, which are no longer scientifically effective as a warm-up technique. The researchers suggest that the reason for the coaches continuing to use this technique within their warm-up reflects a possible lack of transfer of current research-based findings related to the appropriate use of static and dynamic stretches, as both techniques have their place in sport.

5.3.3 Coaches knowledge of/and practice regarding recovery post training or in competition

Promoting recovery post exercise will enhance performance during subsequent training sessions or in competition, lowering the risk of injury (82). The most used interventions are active and passive cool-downs (82). Active cool-down involves the athlete engaging in 5-15 minutes of low to moderate intensity exercise within an hour post exercise in order to facilitate recovery (136, 137). The benefits of completing an active cool-down includes the faster recovery of the athletes' heart rate, reduced effects of muscle soreness post exercise, and a greater removal of metabolic by-products (138). While passive cool-down interventions involve the use of rest, compression, massage, cryotherapy, static stretches, and foam rolling (82). Commonly, coaches and athletes use a combination of active and passive cool-down interventions to receive the best outcomes in their sporting performance.

The practices of the majority of coaches in the present study are aligned with the literature as they make use of a combination of active and passive cool-down interventions. Cool-down regimens used by participating coaches post training or competition consisted of aerobic-based exercises (14) as the active technique, in addition to passive techniques such as static stretches (18). Findings from the D&CP Questionnaire also revealed that coaches encouraged various passive cool-down techniques that athletes could perform in their own capacity.

The timing and duration of the cool-down are two important factors to be considered when implementing a cool-down regimen. A study conducted among dancer aerobics instructors reported an association between the duration of the cool-down and the number of injuries sustained (69). According to Malliou et al. (2007), dancers that completed a 15-minute cool-down reported a reduced injury rate in comparison to those completing and 5- and 10-minute cool-downs (69). Findings from the present study revealed that cool-down regimens were completed for less than 15-minutes (85.7% during training session; 71.4% in competition). Further, one of the coaches did not complete cool-downs with their athletes during competition.

The nature of athletics at competition level enables athletes to compete in multiple events. Therefore, the selection of cool-down interventions should be made to ensure same day performance enhancement (139). Studies have shown that an active recovery benefits athletes' sporting performance when the time between successive races is short (10-20 minutes) (140).

This intervention will continue to benefit the athlete for up to 4 hours but can show small detrimental effects on their performance if races are scheduled more than 4 hours apart (82). According to the findings of the present study, most participating coaches (80.9%) completed their cool-down interventions immediately after their athlete had completed in an event, providing the athlete with the benefits associated with a successful cool-down. Alternatively, one of the coaches completed cool-downs at the end of the competing event, while the remaining coaches did not make use of a cool-down.

5.3.4 Coaches knowledge/practice regarding strength and conditioning

Strength and conditioning programmes are essential in enhancing performance and reducing the risk of injury development (92-94). Research has found that the implementation of programmes 2-3 times per week (97-99) for a duration of 30-90 minutes (95, 99) over a 6-week period (96) has found to beneficial in youth athletes. These findings concur with the findings in the present study as 61.5% of the participating coaches confirmed the use of a strength and conditioning programme in the pre- and off-season. These general programmes included exercises focused on improving the athletes' flexibility, strength, cardiovascular endurance, and technique specific to their sporting code. Majority of the coaches are encouraging their athletes to complete pre-season conditioning programmes.

5.4 Coaches Knowledge regarding their role in Injury Management

Coaches working within low-socioeconomic community-based teams or schools are often required to make decisions regarding the management of injuries sustained during training or competition (11). Coaches are forced to make medical decisions relating to their athlete's injury that may exceed their educational background. From the present study, 81% of participating coaches held a first aid qualification. However, research has shown that despite sufficient first aid knowledge, coaches may still not made use of the correct treatments for management of injuries (11, 101). Ransone and Dunn-Bennett (1999) and Castro (2010), conducted a study amongst 104 and 149 youth coaches working in California, respectively. Both studies requested participating coaches to complete two forms: 1) first aid assessment and 2) game situation data sheet.

Results in these two studies found that 36% of the 104-participating coaching in Ransone and Dunn-Bennett's study, and 11% of the 149 participating coaches in Catsro's study received a score of more than 50%. This mirrors the findings of the present study as Section Four of the MCQ (assessing coaches knowledge pertaining to injury management) yielded a mean score of 35.4%. Research has previously demonstrated that despite obtaining a first aid qualification, coaches are often conflicted with the management process as in many circumstances their primary responsibility is to develop a 'winning' athlete (11). This often leads to a reduction in the quality of care and management provided by coaches to injured athletes. It has also been reported that coaches continue to return injured athletes to competition or training dependent on team success (101).

57% of the participating coaches in the present study did not encourage injured athletes to partake in training until they were completely healed. The remaining nine coaches made use of alternative training techniques in order to keep athletes active, and 69.2% of coaches believed in a gradual return to play regimen before returning to competition. The decision to return to training following an injury is often made within a team environment that may involve multiple health professionals including a sports physician, physiotherapist, and/or medical doctor as well as the athlete (141). According to a survey conducted among health professionals involved in sporting franchises in Canada, medical doctors and physiotherapists are the most effective in assessing factors related to injury risk, possible complication of injury, and the return to play of the athlete (142). However, within school and community-based sporting clubs, the availability of medical professionals is often lacking.

Findings from the present research indicated that participating coaches' beliefs on who decided on the athletes return to training is varied. While the majority of coaches (61.5%) sided with consensus in the literature of having medical professionals decide when an athlete is ready to return to training, many coaches believe that the decision should be made by the coach or parent. This poses as a risk to the athlete as coaches and parents may be influenced by external pressures.

5.5 Limitations of the Present Study

Four major limitations were identified. Firstly, as a result of COVID-19 and the risk that face-to-face interviews would pose to participating coaches, an online questionnaire was created to achieve the aims of the study. However, the main disadvantage of this method of data collection was that the researcher could not explore the rationale and reasoning behind some of the answers provided. Since the researcher was not available to the participant while they completed the questionnaire, there may have been challenges related to interpreting certain questions as this method of data collection did not allow participants to ask clarifying questions. Conducting interviews using a structured interview guide with the participating coaches would provide deeper understanding of coach's knowledge and practices.

The second area of concern was the representation of participating coaches in the sample. The present sample consisted of 26 coaches of a possible 39, with an additional five coaches exercising their right to withdraw from the study resulting in 21 coaches completing the full study. Whether or not the 21 coaches that decided to participate in the study accurately represented the coaching population of all those coaching athletics in the U12-14 age group within low-socioeconomic communities in the WC region is unclear. Although every effort was made to recruit all coaches, the study relied on volunteers. Consequently, the sample may not have been a true representative of the actual population of TDP coaches. Thus, the data has limited generalisability.

Finally, despite the validation of the MCQ and D&CP questionnaire, post-hoc analysis revealed some challenges that may have compromised the findings. The creation of poorly constructed questions results in an increase in the ambiguity which can pose as a disadvantage to participants with different language or reading abilities (143, 144). Within the MCQ, two questions were later identified as being challenging for the participants to interpret. Q3 made use of a double negative which may have caused confusion among the participating coaches. While Q9 used medical terminology such as musculoskeletal and skeletal system. The question relating to whether an athlete should return to training while taking antibiotics (Q40) may have been unfairly used. Despite this being an important topic for coaches to be aware of, this information was not made available to coaches in the coaching resources provided by ASA. The intention behind the inclusion of this question was to challenge and assess coaches who had already obtained their Level 3 coaching certificate.

5.6 Recommendations for Future Research

Recommendations for future studies includes a suggestion to conduct a pilot for the MCQ in order to assess whether there is any ambiguity or areas of misinterpretation in any of the questions. These limitations would have been identified in a pilot study which should have been conducted in conjunction with the validation process. The validation process would have allowed us to detect errors and make the relevant changes required to strengthen the MCQ and demographic questionnaire. By assessing the findings of the pilot study, the researcher will be able to make the changes necessary to produce a strong testing tool.

Another recommendation is to convert the D&CP into a semi-structured interview guide, to allow for deeper and greater understanding of the coaches' practices in their field.

In order to strengthen the efficacy of coaching ability among South African coaches, assistance must be provided to help develop their understanding of various areas including: the analysis and correction of different techniques, strength conditioning and training, as well as ensuring safety and promoting injury prevention (111). Coaching courses need to be adapted to support the current needs of coaches by providing each coach with evidence based information relating to basic coaching education as well as more advanced coaching topics as stated above (105). Ensuring coaching courses meet the needs of the coaches should be enforced by the SANCF.

CHAPTER SIX: SUMMARY AND CONCLUSION

The present study aimed to investigate the knowledge and practices of athletics coaches. The study focused on coaches employed by the TDP branch of the MOD within the under 12-14 age group within the WC. The findings of this study addressed the following aims and objectives outlined in Chapter One:

To describe the coaching qualifications, experience, and coaching practices used to reduce the risk of injury development.

Coaches were qualified and experience was found to be variable. Despite coaches having qualifications in both coaching and first aid, their understanding and practices used did not reflect this. Our findings are similar to that of Ransone and Dunn-Bennett (1999), and Castro (2010), who reported that coaches knowledge pertaining to injury and management was poor (11, 101). This may be as a result of poor transferal of information from literature to coaches or insufficient coaching development throughout their careers.

To assess coaches' knowledge regarding injuries, practices used to reduce the risk of injuries, and their acute medical management of injuries.

Coaches' knowledge was found to be sub optimal, which may be as a result of poor transfer of information from literature to coaches, or insufficient coaching development throughout their careers. The present findings are similar to that of Ransone and Dunn-Bennett (1999), who reported that coaches' knowledge pertaining to injury and management was poor (10).

The use of a pre-season programme (with an average duration of 7 weeks) to prepare athletes for the upcoming season was reported to be used by 19 of the 21 coaches. The focus within the pre-season phase was a combination of strength, flexibility, and cardiovascular fitness which in the literature has been shown to yield the positive results needed to be achieved during a pre-season (91). However, the incorporation of neuromotor development, an important aspect of training and injury prevention, was only used by 30.8% of coaches.

The use of an adequate warm-up and cool-down are also two very important influencing factors that can reduce the risk of injury development (82). Despite that this component of the MCQ was the most correctly answered section, it was found that 42.3% of coaches are still using older techniques such as static stretches, that are no longer scientifically affective in a warm-up. It was found that an average of 10 minutes was used to warm-up athletes prior to a training session or competition, which aligns with the literature (137).

The use of off-season conditioning programmes is an effective tool to reduce the risk of injury development and reduce the rate of deconditioning among athletes. 61.5% of the participating coaches were found to use this tool. Programmes consisted of flexibility, strength, aerobic based training, and technique re-education. Creation of such programmes were seen to be created by coaches (26.9%), conditioning coaches (30.8%), or biokineticists (3.8%).

To describe coaches' understanding and knowledge pertaining to injuries and associated risk factors within the youth athletics athlete population.

Despite majority of coaches having obtained at least their Level One first aid qualification, the average scores achieved by coaches for the section related to injury and injury management were poor (35%). Common management practices used by coaches included ice, compression, and elevation in the event of an acute injury, and the referral to a health professional for more severe injuries. 61.5% of coaches depended on medical professionals to provide clarity on injury diagnosis, management, and return to competition protocols. The remaining 38.5% of coaches believed that decisions regarding return to competition should be made by the coach or the parent. This is concerning as questions relating to classification of injuries associated with athletics and developing athletes scored an average of 50% in the MCQ. If coaches fail to recognise signs and symptoms associated with injury, this may result in the incorrect management of the injured athlete.

By empowering coaches with the knowledge and skills required to reduce the risk of injury development and manage injuries appropriately, developing athletes will receive the support they require. Research in the field of coaches' knowledge and understanding of injuries and the associated risk is factors is critical in the development of community sport in SA. Further research must be conducted to understand why coaches' knowledge is poor and how this can be resolved.

From this study it is clear that more support and greater insight into the needs of the coaches working within the MOD and TDP is warranted. The WC DCAS will be able to use this research as a way to seek improvements and amendments to the current coaching programme. Despite coaches having completed their coaching qualification continuous learning opportunities (such as workshops, evidence based articles, online courses etc.) need to be made readily available to coaches. It is recommended that continuous assessment be implemented for coaches in order to ensure that coaches are developing their skills and staying up to date with the latest research in their field. Implementation of such strategies will provide a platform for continuous learning, therefore, encouraging MOD and TDP coaches to enhance and maintain a high standard of coaching. Thus, allowing for youth to be supported as they develop into high performing athletes. Through the relationships developed as a result of the present study, a basis has been formed for the initiation of further studies being completed in the field of community sport and athletics. The WC DCAS as well as the participating coaches were eager to participate in the study and willing to discuss the concerns raised. This shows the willingness of individuals involved in athletics within the WC to enhance their knowledge and uplift community sport as a whole.

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APPENDICES

Appendix A: Emailed Advertisement

Faculty of Health and Rehabilitation Science
Faculty of Health Sciences

Divisions of Communications Sciences and Disorders, Nursing and Midwifery, Occupational Therapy and Physiotherapy

F45 Old Main Building, Groote Schuur Hospital,
Obseravtory 7925
Tel: 021 406 6401 Fax: 021 4066323
Website: www.uct.ac.za

CALLING ALL U12-15 ATHLETICS COACHES

RE: Coaches knowledge of injury and associated risk factors among young track and field athletes:

A case study on the Western Cape Mass participation, Opportunity and accessibility, Development and growth (MOD) program for U12-U14 track and field athletes

Dear Coaches,

I am a Masters student in the Division of Physiotherapy at The University of Cape Town (UCT) and I will be conducting a study to determine the perceptions, knowledge and understanding that track athletics coaches have with regards to coaching and injury as part of my Master dissertation. It is in the interest of our future athletes that they are provided with the best guidance in order to achieve their full capabilities. As coaches you have an immense amount of influence amongst athletes, parents and communities therefore this study would like to assess the positive attributes South African athletic coaches possess as well as determine the short comings of their knowledge, understanding and perceptions within the coaching field. In gaining this knowledge it will allow for the motivation of structures to be put in place to enhance and improve the coaching within South Africa within the athletics field.

What is the reason for this study?

This study will help us to provide information regarding the knowledge, standard practices and perceptions of athletics coaches. By mapping this information, we hope to gain insight into any areas which may need further understanding. Therefore, enabling us to communicate with sporting officials on how to address these gaps and improve the overall coaching level within the athletics division in the Western Cape.

What does this mean for you?

You will be asked to partake in an online multiple-choice test (MCQ) and an online questionnaire. Questions will include information regarding your education and experience with coaching as a while, your understanding of how to conduct a training session and season, as well as your knowledge of injuries and injury prevention. Both the MCQ and online questionnaire will use the Google Forms platform. This can be accessed via your desktop computer, laptop, tablet or smart phone. The 2-part study will take 30-45 minutes to complete each part. However, the use of Google Forms allows you to complete the study at any location and in your own time.

If you are interested in participating in this study, please complete the consent form attached to this email. The consent form will provide you with detailed information regarding the process of the study. Please note that participating in this study is completely voluntary and all information gathered will be kept confidential throughout the process. Participating in the study does not require disclosure of any personal details as you will be kept anonymous throughout the process. You have the right the withdraw from the study while completing the informed consent forms and during the test without repercussions. However, as a result of the MCQ and questionnaire being anonymous once you have submitted the Google Form you will not be able to withdraw your data.

Potential Risks

There are no potential physical risks in participating in the online MCQ and questionnaire. The 2-part study has been designed as two separate forms. This allows you to complete each part separately in your time. It is estimated for each part to take 30-45 minutes to complete. All Information gathered will de-identified, kept confidential, stored on a password secured cloud-based online platform and not distributed.

A possibility of a psychological burden may pose a threat to coaches during the MCQ phase of the study. You may feel disheartened by the MCQ if you struggle to complete the questions. However, the MCQ provides you with an opportunity to test your current knowledge and gain insight into areas which you can development.

Benefits:

This study will provide the opportunity for you to reflect on your coaching skills and practices. It will enable you to be aware of possible gaps in your knowledge thus giving you the opportunity to learn and grow as a coach. After completing the online MCQ you will be provided with the correct answers to the questions.

From the results drawn from each interview a workshop will be conducted to bring forth the positives of the current coaching system as well as draw in on what is lacking. The workshop will not be to point out the flaws of each coach but rather to provide evidence-based information to coaches regarding the best practices as well as to improve their knowledge if found necessary. Dates for this workshop will be communicated to you via email.

Contact

If you have questions or concerns regarding the study, please feel free to contact the student research on the details below. If you are interested in participating in this study, please complete the consent form attached and send it to the email below.

Neda Isaacs (Master student – researcher who will be in direct contact with you)

Tel Number: 074 360 0017

Email: ISCNED001.masters@gmail.com

Appendix B: Informed Consent Forms

	Faculty of Health and Rehabilitation Science Faculty of Health Sciences Divisions of Communications Sciences and Disorders, Nursing and Midwifery, Occupational Therapy and Physiotherapy F45 Old Main Building, Groote Schuur Hospital, Obseravtory 7925 Tel: 021 406 6401 Fax: 021 4066323 Website: www.uct.ac.za

Coaches knowledge of injury and associated risk factors among young track and field athletes:

A case study on the Western Cape Mass participation, Opportunity and accessibility, Development and growth (MOD) program for U12-U14 track and field athletes

Dear Coaches,

I am a Masters student in the Division of Physiotherapy at The University of Cape Town (UCT) and I will be conducting a study to determine the perceptions, knowledge and understanding that track athletics coaches have with regards to coaching and injury as part of my Master dissertation. It is in the interest of our future athletes that they are provided with the best guidance in order to achieve their full capabilities. As coaches you have an immense amount of influence amongst athletes, parents and communities therefore this study would like to assess the positive attributes South African athletic coaches possess as well as determine the short comings of their knowledge, understanding and perceptions within the coaching field. In gaining this knowledge it will allow for the motivation of structures to be put in place to enhance and improve the coaching within South Africa within the athletics field.

What is the reason for this study?

This study will help us to provide information regarding the knowledge, standard practices and perceptions of athletics coaches. By mapping this information, we hope to gain insight into any areas which may need further understanding. Therefore, enabling us to communicate with sporting officials on how to address these gaps and improve the overall coaching level within the athletics division in the Western Cape.

What does this mean for you?

You will be asked to partake in an online multiple-choice test (MCQ) and an online questionnaire. Questions will include information regarding your education and experience with coaching as a while, your understanding of how to conduct a training session and season, as well as your knowledge of injuries and injury prevention.

Once you have completed this informed consent and returned it to the email provided. A follow up email will be sent to you. The email will contain two separate Google Form links – the first being the MCQ and the second is the questionnaire. Both links can be accessed via your laptop, desktop computer, tablet or smart phone. This 2-part study is estimated to take 30-45 minutes to complete each part. The Google Forum will allow you to complete each part of the study in your own time.

Please note that participating in this study is completely voluntary and all information gathered will be kept confidential throughout the process. If you are interested in participating in this study, please complete the consent form attached to this email. The consent form will provide you with detailed information regarding the process of the study. Please note that participating in this study is completely voluntary and all information gathered will be kept confidential throughout the process. Participating in the study does not require disclosure of any personal details as you will be kept anonymous throughout the process. You have the right the withdraw from the study while completing the informed consent forms and during the test without repercussions.

However, as a result of the MCQ and questionnaire being anonymous once you have submitted the Google Form you will not be able to withdraw your data. You have the right the withdraw from the study while completing the informed consent forms and during the test without repercussions. However, as a result of the MCQ and questionnaire being anonymous once you have submitted the Google Form you will not be able to withdraw your data.

Potential Risks

There are no potential physical risks in participating in the online MCQ and questionnaire. The 2-part study has been designed as two separate forms. This allows you to complete each part separately in your time. It is estimated for each part to take 30-45 minutes to complete. The components have been separated to allow for completion of each task at you own time, thus, reducing an additional burden this study may cause

A possibility of a psychological burden may pose a threat to coaches during the MCQ phase of the study. You may feel disheartened by the MCQ if you struggle to complete the questions. However, the MCQ provides you with an opportunity to test your current knowledge and gain insight into areas which you can development.

All responses will be de-identified and processed anonymously (you will not be asked to provide us with your name, ensuring total anonymity. No other identity information, including IP address will be recorded. At the end of the study the data will be destroyed in compliance with international regulations. Precautions will be taken to control access of all data. Only authorised individuals (principle investigators) will have access to the dataset.

Reducing the risk of breaching confidentiality by collecting and storing data anonymously and by saving data with password protection. The online MCQ and questionnaire has been approved but the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences at the University of Cape Town (HREC No. 554/2019)

Benefits:

This study will provide the opportunity for you to reflect on your coaching skills and practices. It will enable you to be aware of possible gaps in your knowledge thus giving you the opportunity to learn and grow as a coach. From the results of this study, you will be able to see to what extent your coaching abilities impacts the youth athletes' longevity and success. From the results drawn from each interview a workshop will be conducted to bring forth the positives of the current coaching system as well as draw in on what is lacking. The workshop will not be to point out the flaws of each coach but rather to provide evidence-based information to coaches regarding the best practices as well as to improve their knowledge if found necessary. Dates for this workshop will be communicated to you via email.

Contact

If at any time you have any questions about the study, please feel free to contact any of the following individuals. All inquiries will be confidential.

Neda Isaacs (Master student – researcher who will be in direct contact with you)

Tel Number: 074 360 0017

Email: nisaacs.physio@gmail.com

Dr Lieselotte Corten (Master's supervisor)

Physical Address Division of Physiotherapy
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E-mail: l.corten@brighton.ac.uk

Dr Gillian Ferguson (Master's co-supervisor)

Physical Address: Division of Physiotherapy
School of Health and Rehabilitation
University of Cape Town
Groote Schuur Hospital
Anzio Road
Observatory
7725

E-mail: gillian.ferguson@uct.ac.za

You may contact the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee (HREC) if you have any questions or concerns regarding your rights or welfare as a research participant.

FHS Human Research Ethics Admin Office

Physical Address: E53 Room 46 Old Main Building
University of Cape Town
Groote Schuur Hospital
Anzio Road
Observatory
7725

Tel Number: 021 406 6492

Fax: 021 406 6411

Certificate of consent

By signing below, it confirms that you have had sufficient time to read through the study information, that you understand the consent form and that you are willing to participate in this study. You have the right to withdraw at any time as well as ask questions at any time during the study. All information recorded during this study will remain confidential, and no participants will be identified in the case of future publication. Your signature confirms you are aware of the possible risks involved in this study.

_____	_____	_____
Signature of Coach	Name	Date

_____	_____	_____
Signature of Investigator	Name	Date

Appendix C: Information Sheet

PART A: INFORMATION SHEET

My name is Neda Isaacs and I am a master's student in the Division of Physiotherapy at the University of Cape Town

I will be conducting a study to determine the perceptions, knowledge and understanding that track athletics coaches have with regards to coaching and injury as part of my Master dissertation. It is in the interest of our future athletes that they are provided with the best guidance in order to achieve their full capabilities. As coaches you have an immense amount of influence amongst athletes, parents and communities therefore this study would like to assess the positive attributes South African athletic coaches possess as well as determine the short comings of their knowledge, understanding and perceptions within the coaching field. In gaining this knowledge it will allow for the motivation of structures to be put in place to enhance and improve the coaching within South Africa within the athletics field.

What is the reason for this study?

This study will help us to provide information regarding the knowledge, standard practices and perceptions of athletics coaches. By mapping this information, we hope to gain insight into any areas which may need further understanding. Therefore, enabling us to communicate with sporting officials on how to address these gaps and improve the overall coaching level within the athletics division in the Western Cape.

What does this mean for you?

By participating in this study, you will need to complete in an online multiple-choice quiz (MCQ) followed by a questionnaire. The 30 question MCQ will be comprised on basic coaching knowledge and practices as well as questions pertaining to the human body, injury and injury management.

Once completed you will move onto the second component of the study - the questionnaire. The 4-part questionnaire will ask personal information, coaching experience, coaching practices and knowledge regarding injury.

Benefits to participating in this study?

This study will provide the opportunity for you to reflect on your coaching skills and practices. It will enable you to be aware of possible gaps in your knowledge thus giving you the opportunity to learn and grow as a coach. From the results of this study, you will be able to see to what extent your coaching abilities impacts the youth athletes' longevity and success. From the results drawn from the online MCQ and questionnaire will be reported in a workshop to bring forth the positives of the current coaching system as well as draw in on what is lacking. The workshop will not be to point out the flaws of each coach but rather to provide evidence-based information to coaches regarding the best practices as well as to improve their knowledge if found necessary. Dates for this workshop will be communicated to you via email.

Privacy, confidentiality, data collection and potential risks in participating in this study?

There are no potential physical risks in participating in the online MCQ and questionnaire. The MCQ is comprise of 30 questions is followed by the online questionnaire which should take 30 minutes for each task. Totally an hour to complete both components. The components have been separated to allow for completion of each task at you own time, thus, reducing an additional burden this study may cause.

All responses will be de-identified and processed anonymously (you will not be asked to provide us with your name, ensuring total anonymity. no other identity information, including IP address will be recorded. At the end of the study the data will be destroyed in compliance with international regulations. Precautions will be taken to control access of all data. Only authorised individuals (principle investigators) will have access to the dataset.

We are reducing the risk of breaching confidentiality by collecting and storing data anonymously and by saving data with password protection. This questionnaire has been approved but the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences at the University of Cape Town (HREC No. 554/2019)

What if you want to withdraw from the study?

Please note that participating in this study is completely voluntary and all information gathered will be kept confidential throughout the process. You can withdraw at any point during the process without any form of repercussions.

Where can you get further information?

If at any time you have any questions about the study, please feel free to contact any of the following individuals. All inquiries will be confidential.

Neda Isaacs (Master student – researcher who will be in direct contact with you)
Tel Number: 074 360 0017
Email: nisaacs.physio@gmail.com

Dr Lieselotte Corten (Master's supervisor)
Physical Address: Division of Physiotherapy
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Tel Number: +44 12 73 64 47 09
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Dr Gillian Ferguson (Master's co-supervisor)

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FHS Human Research Ethics Admin Office

Physical Address: E53 Room 46 Old Main Building
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Anzio Road
Observatory
7725

Tel Number: 021 406 6492

Fax: 021 406 6411

How do you agree to participate in this study?

If you wish to participate in this study, please click "next" to view the consent form and provide your consent.

PART B: INFORMATION & INFORMED CONSENT

Information and informed consent

Participation is voluntary with no justification required if you decide to not participate or stop your participation at any time. The study consists of 2 main sections: The Multiple-Choice Quiz (MCQ) and the questionnaire taking 30 - 45 minutes to complete.

If I complete this MCQ and questionnaire it means I am an athlete track and/or field coach. Coaching athletes within the u12-15 age group within the Talent Development Programme.

[ ] tick

I confirm that I am coaching youth athletes within the Western Cape Region

[ ] tick

I confirm that I have been coaching at this level for more than 1 year.

[ ] tick

I confirm that I am 18 years or older, have read and understood the instructions provided, and by completing this survey, give my consent to participate in this study.

[ ] tick

Appendix D: Online Multiple-Choice Quiz (Google Form)

This section is made up of 40 yes/no, short answer and multiple-choice questions pertaining to athletics, coaching styles and practices, injuries and injury management. Each question is worth 1 point. Correct answers have been underlined.

Part A: Questions related to warm-up & cool-down

2. True or False. The warm-up must be performed for at least 30 minutes before having to compete.
    - ☐ True
    - ☐ False
3. Which of the following is NOT a component of a warm-up?
    - ☐ Dynamic stretches
    - ☐ Jogging
    - ☐ Sprints
    - ☐ Static stretches
    - ☐ Muscle activation
    - ☐ Agility skill-based exercises
4. Which of the following is not an advantage of warming- up/cooling-down?
    - ☐ Warm up exercises improve blood circulation and enables oxygen to reach muscles fasters while training/competing
    - ☐ Cooling down exercises allows the body more time to remove waste materials that remain in the muscle and circulating blood following intense exercise
    - ☐ Rate of recovery is not dependent on the amount of time spent cooling down
    - ☐ Inadequate warm up places greater risk for developing a muscle and tendon injury
5. True or False. Warm-up reduces the risk of injury development.
    - ☐ True
    - ☐ False

6. True or False. Track athletes should have more cardiovascular based warm-up drills, while field athletes should have more muscle activation-based drills (bridging, crab walks, push-ups etc.)
    - ☐ True
    - ☐ False
7. True or False. On hot days, the body temperature is high, therefore athletes do not need to warm-up.
    - ☐ True
    - ☐ False

Part B: Questions related to athlete development

8. At what age does puberty start amongst boys and girls respectively?
    - ☐ Ages 11-14 years in girls and 10-13 years in boys
    - ☐ Ages 11-14 years in boys and 10-13 years in girls
    - ☐ Ages 11-14 years for boys and girls
    - ☐ Ages 10-13 years for boys and girls
9. What is the most injured structure to be concerned about when coaching athletes of the u12-14 age group?
    - ☐ Bone
    - ☐ Ligament
    - ☐ Tendon
    - ☐ Growth plate
    - ☐ Muscles
10. True or False. During puberty, the musculoskeletal system develops faster than the skeletal system thus increasing the risk of injury.
    - ☐ True
    - ☐ False

11. True or False. Early specialisation in sport increases the athlete's potential of becoming an elite athlete.
    - ☐ True
    - ☐ False
12. Which of the following is not used to determine the maturity level of the athlete?
    - ☐ Physical development
    - ☐ Psychological/Emotional development
    - ☐ Previous exposure
    - ☐ Chronological age
    - ☐ All of the above
13. True or False. Puberty is known as the golden age for skill development.
    - ☐ True
    - ☐ False

Part C: Coaching Strategies

14. True or False. In the u12-14 age group weight training must be incorporated into the strength and conditioning component of training?
    - ☐ True
    - ☐ False
15. True or False. During the developing years of an athlete, training should be closely monitored with emphasis on strength building, endurance and overall ability to win competitions.
    - ☐ True
    - ☐ False
16. Which of the following is NOT considered an external pressure?
    - ☐ Injury
    - ☐ Pressure from family and friends
    - ☐ Academics
    - ☐ Finances

17. True or False. Training goals should be externally driven in order to achieve excellence.
    - True
    - False
18. All the following are used to increase loading of the athlete in order to increase fitness and performance ability EXCEPT?
    - Number of repetitions
    - Speed of exercise performance
    - Heavier weights
    - Longer recovery between sets
19. Which of the following factors do NOT have an impact on training adaptations?
    - Gender
    - Chronological age
    - Developmental age
    - Training age
    - Psychological maturity
20. What is the recommended amount of sleep for an adolescent needed to allow for adequate recovery?
    - 5-6 hours/night
    - 6-7 hours/night
    - 7-8 hours/night
    - 8-9 hours/night
21. Which of the following are considered components of exercise?
    - 1. Speed
    - 2. Endurance
    - 3. Flexibility
    - 4. Strength
    - 5. Proprioception and Balance
    - Option 1,2 & 5
    - Option 1 – 4

- All of the above

22. Which of the following is NOT a characteristic of an anaerobic endurance exercise?
    - Intensity: 90-100%
    - Duration: 10sec-1min
    - Distance: 80-400m
    - Repetition: 1-5
    - Recovery between repetitions: 1-3 minutes
23. Which of the following is NOT classified as strength training?
    - Ballistic Strength
    - Endurance Strength
    - Maximum Strength
    - Elastic Strength
24. True or false. Periodisation is the systematic planning of athletic or physical training in order to achieve the best possible performance ability throughout the competing season
    - True
    - False
25. Which of the following is NOT an outcome of periodisation?
    - To improve their performance times with each training session
    - To optimize the improvement of performance
    - To peak at the right time
    - To reduce the risk of injury
26. What is the time period considered for a single macro cycle when planning a training programme?
    - 1-3 months
    - 4-6 months
    - 1-6 months
    - 12 months

27. Which of the following are NOT identified as components of a mesocycle?

- ☐ Preparation cycle
- ☐ Competition cycle
- ☐ Peak cycle
- ☐ Transition cycle
- ☐ Recovery cycle

28. At which age should periodisation be implemented into the athlete's training regime using macrocycles and mesocycles?

- ☐ U12
- ☐ U13
- ☐ U14
- ☐ All age groups

Part D: Injuries and management

29. When is the athlete most at risk for developing an injury?

- ☐ 1. Beginning of competing season
- ☐ 2. End of competing season
- ☐ 3. During the middle phase of the competing season
- ☐ 4. During the pre-season
- ☐ Option 1 & 2 only
- ☐ Option 2 & 4 only
- ☐ All of the above

30. What is the best method for acute management of a musculoskeletal injuries sustained during training/competition?

- ☐ Rest – Ice – Compression – Elevation
- ☐ Rest – Ice – Compression – Elevation – Protection
- ☐ Ice – Rest
- ☐ Refer to health professional immediately
- ☐ Rest until the athlete feels better

31. Who is responsible for deciding when an injured athlete can return to play? (multiple options can be selected)

- ☐ Doctor
- ☐ Physiotherapist
- ☐ Parent
- ☐ Coach
- ☐ Athlete

32. Sever's disease (pain in the heel as a result of growth plates being affected) is a common injury amongst track athletes. Select the signs and symptoms associated with this condition.

- ☐ Can occur on a both heels simultaneously
- ☐ Pain with palpation of the heel
- ☐ Symptoms most likely to develop towards the end of a season
- ☐ Walking or running on tip toes

33. Osgood Schlatter disease (inflammation/irritation of the attachment of the patella tendon on the shin) is another common injury to the knee associated with the u12-15 age group. Select the signs and symptom that is LEAST associated with this condition.

- ☐ Constant or intermittent pain in the knee
- ☐ Pain with bending the knee
- ☐ Swelling can extend down into shin
- ☐ Symptoms increase with high impact activities
- ☐ Knee feels cold to touch

34. True or False. A tendon attaches bone to bone while ligament attaches muscle to bone.

- ☐ True
- ☐ False

State if the following injuries are classified as a chronic/overuse or acute injury

		Chronic/Overuse Injury	Acute Injury
34	Stress Fracture	X	
35	Muscle Tear		X
36	Tendon Rupture		X
37	Tendonitis	X	
38	Ligament strain		X

39. The signs and symptoms associated with a stress fracture include all of the following EXCEPT?

    - Deep dull ache type of pain
    - Inability to weight bear on injured limb
    - Swelling
    - Pain occurs during or after activity

40. If the athlete has flu-like symptoms and are placed on antibiotics at what stage is he/she able to start training?

    - No training until all symptoms are clear
    - Training can commence immediately once the athlete has completed their medication
    - Training can begin 48 hours after antibiotic has been started and athlete is symptom free
    - Training can begin as soon as the athlete is placed on antibiotics

Appendix E: Demographic and Coaching Practice Questionnaire

The questionnaire is made up of 4 sections: demographic information, coaching experience, coaching practice, and injury management.

Part A: Demographic Information

1. Date of birth:_____
2. Age:_____
3. Gender: Male Female
4. Coaching: Part Time Full Time
5. Club/School:_____
6. Number of hours per week coaching: _____

Part B: Coaching Experience

1. How many years have you been coaching for in total? (since you started this career)

   _____years

2. What field of athletics are you currently coaching?

Event:	**Distance:**	**Select**
Hurdles	75m (u12 only)	
	80m (u13/14 only)	
	100m (u13/14 only)	
	150m (u12 only)	
Sprint	100m	
	150m (u12 only	
	200m (u13/14 only)	
Medium Distance	400m (u14 only)	
	800m (u13/14 only)	
Relay	400m	
	800m	

Long Distance	1200m (u12 only)	
	1500m (u13/14 only)	
Steeplechase	2000m (u14 only)	
Long jump		
Triple jump		
High jump		
Pole volt		
Discus		
Javelin		
Shot put		
Hammer throw		
Decathlon		
Heptathlon		

3. Which age group are you currently coaching? (Select all the options that apply)

   - ☐ U10
   - ☐ U11
   - ☐ U12
   - ☐ U13
   - ☐ U14

4. How many athletes are you currently coaching within this/each age group?

   - ☐ U10: _____
   - ☐ U11: _____
   - ☐ U12: _____
   - ☐ U13: _____
   - ☐ U14: _____
   - ☐ Additional athletes:_____

5. How many years have you been coaching in this current discipline?

   _____years

6. Which other age groups have you coached during your career as a coach? (You can tick more than 1 option)
    - ☐ U8-9
    - ☐ U10-11
    - ☐ U16
    - ☐ U18
    - ☐ U21
    - ☐ Overs
7. Do you have any qualifications in coaching?
    - ☐ Yes
    - ☐ No
8. If yes please select the type of qualification and name all qualifications, the organization you obtained it with, and the year completed.

Category	Level	Name of course/level	Institution/organisation	Year
Tertiary/higher education	BSc			
	MSc			
	Postgraduate diploma/ certificate			
	Other			
Athletics South Africa	Level 1			
	Level 2			
	Level 3			
	Other			
International coaching qualification				
Other				

9. What methods do you use to learn about the latest developments in the sport of athletics and coaching?
    - ☐ Internet
    - ☐ Online courses
    - ☐ Coaching workshops
    - ☐ Discussion with other coaches
    - ☐ None
10. What is the highest level you have coached at (select one)?
    - ☐ Primary School
    - ☐ High School
    - ☐ Club
    - ☐ Provincial
    - ☐ National
11. Specify the number of years at this level

    _____ years
12. Why did you choose to coach athletics? You can select more than one option.
    - ☐ I love the sport
    - ☐ I am an athlete myself
    - ☐ I love working with children
    - ☐ I like making a difference in people's life through sport/athletics
    - ☐ It provides me with a salary
    - ☐ Other: _____

Part B: Coaching Practices

13. Do you incorporate a pre-season into your competing season?
    - ☐ Yes
    - ☐ No
14. How long is the pre-season?

_____weeks

15. Which of the following components of physical fitness training does your pre-season consist of? (select all that apply)?
    - ☐ Flexibility (stretching)
    - ☐ Strengthening
    - ☐ Cardiorespiratory Endurance (aerobic conditioning)
    - ☐ Anaerobic capacity (sprint, short burst, high intensity, ballistic)
    - ☐ Neuromotor training (balance, agility)
16. How many weekly training sessions do the athletes have and how long is a typical session?
    - ☐ 1-2 sessions/week
    - ☐ 2-3 sessions/week
    - ☐ 3-4 sessions/week
    - ☐ 4-5 sessions/week
    - ☐ >5 sessions
17. How long is a typical session?
    - ☐ 30-45 min/session
    - ☐ 45-60 min/session
    - ☐ 60-90 min/session
    - ☐ >90 min/session
18. Does the team continue with conditioning training during the competing season or do you just focus on technique training?
    - ☐ Technique training only
    - ☐ Combination of technique training and conditioning
    - ☐ None

19. Within a typical training session, how much time do you spend on each of the following categories of training:

Category	0 min	5-10 min	10-15 min	15-20min	20-25 min	25-30 min	30-35 min
Warm up							
Prehab							
Aerobic training							
Strength training							
Anaerobic training							
Agility and Balance							
Specific Technique training and retraining							
Cool down							
Stretching /Flexibility training							

20. What does your warmup consist of during training? Select all that apply

- ☐ Aerobic activities (e.g. jogging, running, etc.)
- ☐ Dynamic stretches
- ☐ Static stretches
- ☐ Anaerobic activities (e.g. jumping, sprinting, etc.)
- ☐ Agility activities
- ☐ Resistance training (e.g. TheraBand)
- ☐ Weightlifting exercises
- ☐ Ballistic exercises/activities (hopping, jumping)
- ☐ Balance exercises
- ☐ Other_____

21. What does your cool down consist of during training? Select all that apply

- ☐ Aerobic activities (e.g. jogging, running, etc.)
- ☐ Dynamic stretches
- ☐ Static stretches
- ☐ Anaerobic activities (e.g. jumping, sprinting, etc.)
- ☐ Agility activities
- ☐ Resistance training (e.g. TheraBand)
- ☐ Weightlifting exercises
- ☐ Ballistic exercises/activities (hopping, jumping)
- ☐ Balance exercises
- ☐ Other_____

22. How many competitions do your athletes compete in during a single season (average amongst your athletes)?

_____ number of competitions

23. Do you educate your athletes on specific practices they should follow prior to competition (e.g. Dietary advice, injury prevention, sleep)?

- ☐ Yes
- ☐ No

24. Which of the following practices do you use? (multiple options can be selected)

- ☐ Rest
- ☐ Change in diet – encouraging players to eat more carbohydrates
- ☐ Change in liquid intake
- ☐ Increase training load but reduced intensity
- ☐ Increased training load and increase intensity
- ☐ Tapering of training load but keeping intensity of training
- ☐ Tapering with reduction in intensity of training
- ☐ Encourage sufficient sleep
- ☐ Other_____

25. Do you warm up the players prior to their track event?

- ☐ Yes
- ☐ No

26. How long before their race does your players warm up?

- ☐ No warm-up performed
- ☐ 0-15 minutes
- ☐ 15-30 minutes
- ☐ 30-45 minutes
- ☐ 45-60 minutes

27. Who is responsible for the warmup?

- ☐ Coaches
- ☐ Athletes
- ☐ Managers
- ☐ Parents
- ☐ No one as there is no warmup

28. Select the components of your warmup from the list below (multiple options can be selected

- ☐ Dynamic stretches
- ☐ Static stretches
- ☐ Aerobic activities (e.g. jogging, running)
- ☐ Anaerobic activities (e.g. jumping, sprinting, etc.)
- ☐ Agility activities
- ☐ Resistance training (e.g. TheraBand)
- ☐ Weightlifting exercises
- ☐ Ballistic exercises/activities (hopping, jumping)
- ☐ Balance exercises
- ☐ Other_____

  _____

  _____

29. Do you cool down the players after their track event?

- Yes
- No

30. Does your athlete's cool-down after each event or at the end of the competition?

- After each completed event
- At the end of competition
- Does not cool-down at all

31. How long after the competing event does your athlete cool-down?

- No cool-down performed
- 0-15 minutes
- 15-30 minutes
- 30-45 minutes
- 45-60 minutes

32. Who is responsible for the cool down?

- Coaches
- Athletes
- Managers
- Parents
- No one as there is no cool-down performed

33. Select the components of your cool down from the list below (multiple options can be selected

- Dynamic stretches
- Static stretches
- Aerobic activities (e.g. jogging, running, etc.)
- Anaerobic activities (e.g. jumping, sprinting, etc.)
- Agility activities (e.g. slalom)
- Resistance training (e.g. TheraBand)
- Weightlifting exercises
- Ballistic exercises/activities (hopping, jumping)

- ☐ Balance exercises
- ☐ Other_____

_____

34. Do you practice any recovery techniques during the season?
    - ☐ Cryotherapy – ice baths
    - ☐ Static stretching
    - ☐ Dynamic stretches
    - ☐ Foam rolling
    - ☐ Rest
35. Are the athletes given programmes to complete during the off season?
    - ☐ Yes
    - ☐ No
36. If yes, who creates these programmes
    - ☐ Coaches
    - ☐ Conditioning coach
    - ☐ Biokinetics
    - ☐ Manager
    - ☐ No-one as no conditioning programmes are made for athletes
37. What components does your off-season programme consist of? (choose multiple options if needed be)
    - ☐ Flexibility (stretching)
    - ☐ Strengthening
    - ☐ Cardiorespiratory Endurance (aerobic conditioning)
    - ☐ Anaerobic capacity (sprint, short burst, high intensity, ballistic)
    - ☐ Neuromotor training (balance, agility)
    - ☐ Other_____

Part C: Practices regarding injuries

38. Do you have a first aid qualification?
    - ☐ Yes
    - ☐ No
39. What level is your latest first aid course? _____
40. What year was this achieved this level? _____
41. Do you perform preseason testing with regards to injury history, growth development, posture, strength, and flexibility?
    - ☐ Yes
    - ☐ No
42. Do you believe that youth athletes experiencing pain is normal?
    - ☐ Yes
    - ☐ No
43. Have you ever stopped a training session with an athlete if they complain of pain?
    - ☐ Yes
    - ☐ No
44. What is your protocol if an injury is sustained by an athlete during a training session?
    - ☐ Ice
    - ☐ Compression
    - ☐ Elevation
    - ☐ Protection – strapping
    - ☐ Medication
    - ☐ Refer to medical practitioner
45. What is your protocol if an injury is sustained by an athlete during a competition?
    - ☐ Ice
    - ☐ Compression
    - ☐ Elevation
    - ☐ Protection – strapping
    - ☐ Medication

- Refer to medical practitioner

46. Where do your athletes receive medical attention if they have sustained a severe injury (eg. fracture or muscle/ligament tear) during a training session?
    - No medical treatment available
    - Coach is a certified first aider
    - First aiders provided during practice
    - Assessed by coach before receiving further treatment
    - Taken straight to medical facility
47. Where do your athletes receive medical attention if they have sustained a minor injury (eg. Fracture or muscle/ligament tear) during a competition season?
    - No medical treatment available
    - Coach is a certified first aider
    - First aiders provided during competition
    - Assessed by coach before receiving further treatment
    - Taken straight to medical facility
48. Do athletes continue with alternative training techniques while injured or do they have to sit out?
    - Alternative training
    - No training
49. Which of the following forms of alternative training do you practice when a player is injured?
    - Active rest
    - Strengthening
    - Stretching
    - Technical training
    - Other _____
50. With return to training/competition – who decide the athlete can return to compete? Coach, athlete, parent, medical professional? (You can tick more than 1 option)
    - Coach

- Athlete
- Parent
- Medical professional

51. Have you ever compromised an athletes healing post injury to allow the athlete to compete at a competition?
    - Yes
    - No
52. With return to training/competition - Who decides when an injured athlete can return to competing?
    - Coach
    - Athlete
    - Parent
    - Medical professional
53. With return to training/competition - Following injury will the athlete be placed into normal training or will there be a gradual return to play?
    - Normal training load
    - Gradual return to play

Appendix F: Human Research Ethics Committee Ethical Approval

UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

HUMAN RESEARCH ETHICS COMMITTEE
07 JUL 2020
UNIVERSITY OF CAPE TOWN

Form FHS006: Protocol Amendment

HREC office use only (FWA00001637; IRB00001838)		
☑ Approved	☑ Type of review: Expedited	☐ Full committee
This serves as notification that all changes and documentation described below are approved.		
Signature HREC Chairperson / Designee	Signature Removed	Date 8/7/20

Note: All major amendments must include a local **PI Synopsis** justifying the changes for the amendment. Please note that incomplete amendment submissions will not be reviewed.

Please email this form and supporting documents (if applicable) in a combined pdf-file to hrec-enquiries@uct.ac.za.

Please clarify your plan for research-related activities during COVID-19 lockdown.

Comments from the HREC to the Principal Investigator:
Note: The approval of this protocol amendment does not grant annual approval. Please complete the FHS016 / FHS017 form for annual approval at least one month before study expiration.

Principal Investigator to complete the following:

1. Protocol Information

Date (when submitting this form)	
HREC REF Number	554/2019
Protocol title	**Coaches knowledge of injury and associated risk factors among young track and field athletes:** *A case study on the Western Cape Mass participation, Opportunity and accessibility, Development and growth (MOD) program for U12-U14 track and field athletes*
Protocol number (if applicable)	
Principal Investigator	Gillian Ferguson
Department / Office Internal Mail Address	Dept Health and Rehab Sciences F45 Old Main Building Groote Schuur Hospital

1.1 Is this a major or a minor amendment? (see FHS006hlp) Major (tick box) Minor (tick box)	☐ Major	x Minor

Appendix G: Endorsement from the WC Department of Sports and Recreation

DIRECTORATE: SPORT DEVELOPMENT

Claude.Meyer@westerncape.gov.za
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fax: +27 21 483 9661

REFERENCE: Letter of endorsement
ENQUIRIES: Mr C Meyer

To whom it may concern

LETTER OF ENDORSEMENT: MASTER STUDY PROJECT (MS N ISAACS)

This letter serves to indicate that the Directorate: Sport Development, from the Department of Cultural Affairs and Sport (DCAS) based in the Western Cape, has endorsed the Master Study Project of Ms Neda Isaacs.

Ms Isaacs has been granted permission to complete the study, which looks at the role of coaches, working in historically disadvantaged communities experiencing socio – economic challenges. Coaches are employed in the **M**ass participation, **O**pportunity and access and **D**evelopment (MOD) Programme, implemented by Directorate: Sport Development of DCAS.

The study involves coaches training u/12 – u/14 school – going athletes in athletics, which is one of sixteen (16) School Sport priority codes. Ms Isaacs was granted permission to communicate with the coaches. The study also deals with Talent Identification. The athletes attend MOD Centres, which are identified schools, which are in turn linked to clubs in the respective communities.

Furthermore, I am aware of the progress of the study, through on – going updates received from Ms Isaacs.

We eagerly await the findings of the study, and thank Ms Isaacs for her commitment to the study, which may ultimately benefit coaches and athletes, in the identified communities, our province and our country.

Her contribution, through this study, to sport and recreation is truly valued.

We wish Ms Isaacs well with the completion of the study.

Yours sincerely

Signature Removed

C. Meyer
Deputy Director: School Sport
2021.02.22

Appendix H: Histogram representing the number of coaches coaching in various athletics disciplines.