



Rapid Assessment of Personnel and Equipment Availability in Sports Medicine Services

Penilaian Cepat Ketersediaan Tenaga dan Peralatan pada Layanan Kedokteran Olahraga

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ABSTRACT

Hospitals that already have sports medicine services need to constantly make improvements and innovations to ensure the implementation of complete services. This study aims to explain the description of the availability of personnel and equipment at a hospital in Jakarta and the extent of their suitability based on literature studies in order to support sports medicine services. This research method is descriptive qualitative with triangulation methods, namely observation, in-depth interviews with 4 key informants, review of hospital documents, and is equipped with a literature study to match the personnel and equipment available with those found in the literature study. This research is located at a hospital in Jakarta, which runs from November 3, 2020 to December 1, 2020. The results show that the hospital has sufficiently complete personnel and only needs to complete the availability of sports psychologists. Meanwhile, nutritionists and dentists can ask for the willingness of the staff in the hospital to join as a sports medicine team. For podiatrists and health education providers, their role can be carried out by other personnel in the field of sports medicine who have similar competencies. The equipment owned by that hospital is also quite complete, but it should be equipped with MRI, as well as tools that have become gold standards, including CPET and DXA Scan. The fulfillment of these personnel and equipment should be a development plan for sports medicine services in stages in the future.

ABSTRAK

Rumah sakit yang telah memiliki layanan kedokteran olahraga perlu senantiasa melakukan perbaikan dan inovasi guna menjamin terselenggaranya pelayanan paripurna. Penelitian ini bertujuan menjelaskan gambaran ketersediaan tenaga dan peralatan di salah satu rumah sakit di Jakarta dan kesesuaiannya berdasarkan studi pustaka dalam rangka menunjang pelayanan kedokteran olahraga (sports medicine). Metode penelitian ini adalah deskriptif kualitatif dengan triangulasi metode yaitu observasi, wawancara mendalam dengan 4 informan kunci, telaah dokumen rumah sakit, dan dilengkapi dengan penelusuran studi pustaka untuk mencocokkan antara tenaga dan peralatan yang tersedia di rumah sakit tersebut dengan yang ditemukan pada studi pustaka. Penelitian ini berlokasi di sebuah rumah sakit di Jakarta yang berlangsung sejak 3 November 2020 sampai dengan 1 Desember 2020. Hasil penelitian menunjukkan bahwa rumah sakit telah memiliki tenaga yang cukup lengkap dan hanya perlu melengkapi ketersediaan dari tenaga psikolog olahraga. Sedangkan tenaga nutrisi dan tenaga dokter gigi dapat meminta kesediaan dari tenaga yang terdapat di rumah sakit tersebut untuk bergabung sebagai tim kedokteran olahraga. Sementara itu, untuk tenaga ahli penyakit kaki dan tenaga pemberi edukasi kesehatan perannya dapat dilakukan oleh tenaga lain di bidang kedokteran olahraga yang memiliki kompetensi serupa. Peralatan yang dimiliki juga sudah cukup lengkap, namun sebaiknya perlu dilengkapi dengan MRI, serta alat yang menjadi gold standar, diantaranya CPET dan DXA Scan. Pemenuhan dari tenaga dan peralatan tersebut hendaknya menjadi rencana pengembangan layanan kedokteran olahraga (sports medicine) secara bertahap ke depannya.

INTRODUCTION

Sports medicine is a branch of medical field that deals with injuries and diseases that occur due to sports, injury recovery efforts, including preventing the occurrence of more serious sports-related health problems, both physically and emotionally, which are not only limited to medical procedures such as surgery and treatment, as well as efforts to improve the performance of an athlete.¹ Development of sports medicine services that have undergone a change from services aimed only at elite, professional, or Olympic competitive athletes,² then now it is a service aimed at anyone who wants to do sports and improve their fitness and performance, opening up great opportunities for hospitals to be able to develop their services in the field of sports medicine.

Hospitals that want to expand their services in the field of sports medicine need to prepare themselves by providing all the resources needed, one of which is the personnel who will provide sports medicine services and also the equipment. Meanwhile, hospitals that have previously developed their services in the field of sports medicine also need to continue to make improvements to ensure the implementation of complete services and always innovate amid the increasingly complex demands of patients for the quality of hospital services, as well as increasingly tight competition in hospitals.

This is as is being done by a hospital in Jakarta which has been providing sports medicine services since 2014 and increasingly focused on developing this service as one of its centers of excellence services. This hospital also stated its commitment to always provide professional staff and equipment to support services in accordance with the needs of sports medicine services.

On the other hand, there are matters that have been determined based on literature studies related to manpower and equipment that need to be equipped in order to provide quality sports medicine services. In a previous study, Paramita and Ayuningtyas, mapped the concept of sports medicine services in hospitals with the scoping review method, including those related to personnel and equipment. The study stated that the personnel involved were doctors from various specialties as well as professions from various disciplines in the field of sports medicine. While

some of the equipment used includes ultrasound, sensor-based physical examination support, rehabilitation equipment, and arthroscopy.³ Previous research is unfortunately still limited to a literature study and has not seen how the conditions are directly encountered in hospitals, so they have not been able to see their conformity with those found in the literature study.

Therefore, this study aims to describe the availability of personnel and equipment at that hospital and the suitability of these personnel and equipment based on literature studies in support of sports medicine services.

MATERIAL AND METHOD

This research is a qualitative descriptive study using triangulation methods, by observing direct participation various personnel who provide services and equipment provided by the hospital to provide sports medicine services for 1 month, to be exact 2 times a week (every Tuesday and Wednesday) for 6-7 hours. Then followed by conducting in-depth interviews with the General Clinic Manager, and Team Leader, as well as 2 Coordinators (nurse coordinator and physiotherapists coordinator) as key informants. The selection of informants was based on the researcher's observations that they are the most involved and responsible people to ensure the good running of sports medicine services, who regulates every task and responsibility of other human resources, and best knows the information needed related to the services that have been provided so far.

In addition, the research was also followed by a review of hospital documents related to the implementation of sports masking services, such as service manual documents, standard operating procedures, and details of the clinical authority of each profession that provides sports medicine services.

To complement the research, the researcher also carried out a literature study search and then matched various things about the availability of personnel and equipment found with various things found in the literature study. This research is located at one of the hospitals in Jakarta, which took place from 3 November 2020 to 1 December 2020 by prioritizing the principles of research ethics through approval after

explanation, and respecting the privacy and confidentiality of all data and the identity of the informant and the hospital where the research was conducted.

RESULTS

This hospital is a general hospital located in Jakarta and has started providing sports medicine services since 2014 and has become a sports medicine service as one of its center of excellence services with a focus on comprehensive health management of athletes and sports injuries, as well as support athletes and sports actors to return to their sporting activities, more specifically to the sport by increasing their performance and at the same time improving the quality of life with a healthy lifestyle.

Personnel Availability

Currently, sports medicine services are carried out by a sports medicine team consisting of 1 sports medicine specialist, 4 sports medicine consultant orthopedic surgeons, 3 nurses, and 6 sports physiotherapists. Apart from the team, this service is also assisted by 2 secretaries, 1 pharmacy staff, 6 administrative and cashier staff, and 2 cleaning services staff.

Coaches are usually found at athletes' training locations and it is recommended that the trainers always accompany the athletes when conducting consultations or taking action by a doctor. Meanwhile, the staff who are most often seen in hospitals are usually clinical support personnel, although there are hospitals that also carry out research in the field of sports medicine.

Specialists come to this hospital according to predetermined hours of practice, except for sports medicine specialists who come only by appointment. Sports physiotherapists work in 2 shifts, namely morning shifts, starting at 08.00-15.00 and day shifts at 14.00-21.00. Nurses are also in 2 shifts, namely the morning shift, starting at 08.00-15.00 and the afternoon shift at 14.00-21.00, sometimes there is a middle shift.

Based on their competence, this hospital has a specialist sports medicine doctor with an educational background of Sp-1 in sports medicine. Meanwhile, orthopedic surgeons are sports medicine consultants with a background in subspecialty education and a consultancy degree in the field of sports medicine. Meanwhile, sports

physiotherapists have a minimum education of a D-IV and then continue to attend training in the field of sports medicine. As the following narrative:

"Physiotherapists here must be at least D4, must have experience in sports, be it as a medical team, instructor, coach, have a certification from PFOI, such as taping sports, A to Z training for injury cases. So not blind with sports injuries... then level one training." (14)

"Physiotherapy must be related to sports. It can't be careless." (11)

Initially, this hospital even had sports physiotherapists who had participated in training in the Philippines, but unfortunately, even though this staff has shared knowledge with other sports physiotherapists, this staff has resigned.

"Actually, we used to have a sports physiotherapist who we gave training to the Philippines, had transferred knowledge to his friends, but he himself resigned." (12)

Finally, for nurses, there are those with DIII Nursing education and some with Nursing Profession education (NERS). The suitability of sports medicine service providers between literature study and those provided by this hospital, namely (Table 1).

Some literature also adds that in addition to sports medicine specialists and sports medicine consultant orthopedic surgeons, the presence of physical medicine and rehabilitation specialists is also important in a sports medicine team.⁴ Other literature includes doctors who specialize in heart and blood vessels.^{5,6}

Equipment Availability

Meanwhile, from the equipment provided by the hospital, there is equipment that is specifically placed in the sports medicine service unit, one example of which is physiotherapy modalities such as Transcutaneous Electrical Nerve Stimulation (TENS), Ultrasound, Shock Wave Therapy (SWT), Laser, and Ice Packed.

There is also equipment that is not specifically placed in a sports medicine service unit but is available as a hospital facility so that this tool is also very helpful to support sports medicine services, such as arthroscopy equipment for management operations, various equipment for laboratory examinations, and radiological examinations such as Conventional Radiology (X-Ray), Computed Tomography Scan (CT-Scan), Ultrasonography, Echocardiography.

Table 1. The Suitability of the Availability of Personnel in Sports Medicine Services at XYZ Hospital with a Literature Study

Sports Medicine Team According to Literature Study	Personnel at RS XYZ		Information
	Sports Medicine Team	Non-Sports Medicine Team	
Medical Specialist	√ Sports Medicine Specialist Consultant Orthopedic Surgeon, Sports Medicine	√ Various Other Specialist Doctors	
Physiotherapist	√		No There is no specific profession in the field of specialist foot disease Maintenance of Hospital Facilities and Infrastructure
Sports Psychologist			
Nutritionalist		√	
Dentist		√	
Podiatrist			
Equipment Manager Staff	√	√	
Health Education Provider			

Source: Primary data, 2020

There is also actually has other modalities such as Shock Wave Diathermy (SWD), Microwave Diathermy, and Infrared Ray, but according to the informants, these modalities are not suitable for use in the management of sports injuries, as follows:

"Most sports physiotherapists only use ultrasound, TENS." (17)

"The most important things are ultrasound, TENS, and ice packed. The addition of SWT. In sport don't use SWD/heater. Light is not used. In sports, heating is not a good modality. It is for vasoconstriction, but we're for vasoconstriction." (14)

However, the informant's opinion was different from one of the studies which stated that SWD can also overcome problems, one of which is knee osteoarthritis.⁷ In addition to the physiotherapy modality equipment, it is also equipped with Gym equipment as follows (Tables 2).

The availability of the equipment was felt to be sufficient by the informant as a service provider, it was just that the informant provided input if the equipment should be upgraded to be more modern.

"Here it is adequate ... at most the problem of developing models such as we are still using ice packed, other hospitals have used compressors." (14)

XYZ Hospital does not have Cardiopulmonary Exercise Testing (CPET) for VO₂Max measurement, Magnetic Resonance Imaging (MRI) and

Bone Mineral Densitometry (BMD) for bone density measurement or Dual X-Ray Absorptiometry Scan (DXA Scan) which is used for body composition measurements.

"We don't have CPET at this time" (17)

"We don't have an MRI. There are many who need MRI, especially in our case, the majority of ACLs. If there is a patient who needs an MRI, we will refer to the nearest hospital. We take the patient there by ambulance" (13)

In order to continue to provide optimal service, the hospital collaborates with local hospitals to carry out MRI examinations. Meanwhile, body composition measurements were carried out using a Body Mass Index (BMI) measuring device with the Takita Brand.

DISCUSSION

Personnel Availability

Based on Table 1 regarding the suitability of the availability of personnel in sports medicine services at this hospital with a literature study, it already has various types of workforces that can support sports medicine services, and not only from one type of profession. This is in line with other studies which state that the providers of sports medicine are not only sports medicine specialists, but also other specialists and disciplines who have interests and competences in the field of sports.³

Table 2. Facilities and Equipment in the Gym Room 1 and Room 2

Name of Goods or Equipment	Amount
Room 1	
Adjustable Hi / Lo Pulley (Tool 1 set, Grip handle 2 pieces, leg tie 1 piece)	
Leg Press	1 set
V Bench Leg Curl	1 set
X2FIT Exercise	1 set
Dumble Set (1 piece of dumble rack, 2 pieces of 2.5 kg dumble, 2 5 kg dumble, 2 7.5 kg dumble, 2 10 kg dumble, 2 12.5 kg dumble 2 pieces, 2 15 kg dumble 2 pieces of dumble 17.5 kg, 2 pieces of 20 kg dumble, 2 pieces of 22.5 kg dumble, 2 pieces of 25 kg dumble, 2 pieces of dumble 27.5, 2 pieces of dumble 30 kg, 2 pieces of dumble pink	1 set
Patient's bed	1 piece
Exercise Chair	1 piece
TRX set Rip-60 (TRX training strap)	1 piece
Brown round chair	2 pieces
Foam	5 pieces
Football	2 pieces
Obstacle	5 pieces
Yoga Mat	2 pieces
Baseball	1 piece
Decathlon Rubber	1 piece
Basketball	2 pieces
Box Exercise (15 cm, 30 cm, 45 cm, 60 cm)	4 pieces
Long Cone	8 pieces
Short Cone	13 pieces
Kettle Bell 4 kg	2 pieces
Kettle Bell 6 kg	2 pieces
3 kg ball	1 piece
Toolbox	1 piece
Balance	1 piece
Room 2	
Static Bike Impulse (with and without backrest)	1 piece
Treadmill	2 pieces
Gym Ball	6 pieces
Yoga Carpet	6 pieces
Trampoline	2 pieces
Cone Exercise	8 pieces
Air Pad (for balance training)	1 piece
Agility Ladder	1 piece
Flexibility Box Test	1 piece
Life Fitness X91	1 piece
Foam Roller	1 piece
Bed Matrass	1 piece
Basketball	2 pieces
Foam	4 pieces
Short Cone	10 pieces
Meter	2 pieces
Football	4 pieces
Bosu	1 piece
Ball Pump	1 piece
Toolbox	1 piece
Balance	1 piece

Source: Primary data, 2020

The clinical support staff consists of specialist doctors, physiotherapists, sports psychologists, nutritionists, dentists, podiatrists, equipment managers, and health education providers. In detail, it can be seen as in the following picture (Figure 1).

According to Madden et al., service providers who are included in the sports medicine team consist of several elements, namely elements of doctors who consist of clinical support staff and support staff in the field of research; elements of a trainer (coach); elements of athletic trainer power, where all three will surround an athlete. The environment around the athlete itself is also surrounded by "other individuals" ranging from teachers, friends, teams, and their families.⁸

In line with Madden et al., Elmagd's research also states that several practitioners in the field of sports medicine, apart from sports medicine specialists, also collaborate with various other health and fitness professions such as nutritionists, psychologists, and health managers or trainers. Each specialization has attended training in their respective fields with a minimum education of a bachelor or graduate degree, and even needs to have practical experience in their field for several years.¹

In this case, according to the research conducted by Madden, it seems to only need to complement the availability of sports psychologists that do not yet have.⁸ Meanwhile, for nutritionists and dentists, the hospital should ask the hospital's willingness to join as a sports medicine team. On the other hand, for podiatrists and health educators, their roles can be performed by doctors in the field of sports medicine who have competence in the foot area,⁹ and other personnel with competence as health educators during their previous education.

The occurrence of sports injuries in elite and recreational athlete can have a negative impact and even cause emotional disturbances. When injured, athletes will experience various emotional and psychological stresses¹⁰ such as depression, anxiety,¹¹⁻¹³ loss of their identity,^{11,12} suicidal ideation, eating disorders, substance use/abuse, fluctuations in motivation, feelings of exclusion,¹¹ recurring injury, requiring longer physical rehabilitation, career transition,¹² or even ending their career as an athlete.

Psychological stress due to injury will increase the risk of infection and inflammation which will affect the time to achieve return to play.¹⁰ Injury recovery in athletes is not complete until the athlete is psychologically ready to return to play.¹⁴ Just as athletes need a physical healing process, they also need psychological healing or intervention from injuries such as helping the injured athlete cope more effectively with these emotional responses and help prepare them to get back to their sport and games.¹⁵

Apart from injury, various other mental risks such as sleep disturbances, failure, overtraining, and low social support, especially in elite athletes, can affect the severity and emergence of certain mental health symptoms that require appropriate recovery response strategies.¹⁶ Therefore, the existence of a sports psychologists in this matter is very important to restore the mental health of athletes.

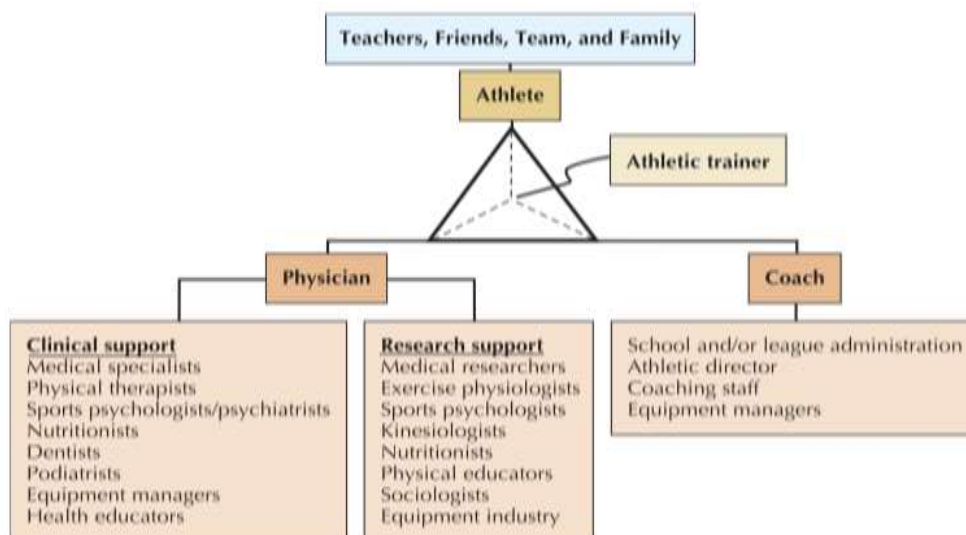
Sports psychologists teach techniques to help athletes improve their motor skills, help athletes cope with competitive stress and anxiety, fine-tune the level of awareness athletes need to achieve optimal performance and not lose focus amid distractions and in a competitive environment, trying to determine the relationship between two or more variables, e.g. anxiety and performance, or conducting experiments to find out changes that occur in an athlete either in the

training environment or on the field, help reduce or prevent emotional problems in individual athletes and teams while trying to increase the athlete's emotional performance potential, help athletes have a good level of coping after injury, and educate prospective athletes, coaches and others related to sports, including administrators.^{15,17}

A podiatrist is a podiatrist or registered primary health care practitioner, as well as a doctor of podiatric medicine or podiatric surgeon.^{9,18} using medical, physical, palliative and surgical means,⁹ who have the education and training qualifications to diagnose, treat,¹⁸ prevent, and rehabilitation treatment of conditions⁹, disorders, diseases, and injuries affecting the feet, ankles and related structures in the feet and lower legs.^{9,18}

As part of a health care team, podiatrists work closely with other health professionals to treat and control disease. They also prevent, manage and treat leg pain, deformities and infections and aim to keep people of all ages moving and as active as possible.¹⁹ This expertise as a podiatrist can be obtained from formal education as a specialization, as well as training.

In Indonesia, there is no special specialization to deepen foot problems, but patients can consult a doctor who has competence about feet according to their complaints.²⁰



Source: Madden et al. (2018)

Figure 1. Sports Medicine Team

Equipment Availability

Based on the available equipment, when viewed based on its function as exercise and fitness checks related to health (health-related fitness) and fitness tests related to skills (skill-related fitness), it actually fulfills service needs. The existence of various rehabilitation equipment provided by the hospital is also felt right. According to research, rehabilitative equipment such as radial Extracorporeal Shock Wave Therapy (rESWT) is a non-invasive procedure that can stimulate tissue regeneration and angiogenesis and has been used effectively to treat various types of tendinopathy and fasciopathy including plantar fasciopathy, Achilles tendinopathy, patellar tendinopathy, greater trochanteric pain syndrome, proximal hamstring tendinopathy, lateral and medial epicondylitis, and calcifying tendinosis of the shoulder.²¹

Ultrasound is also useful and according to research, it is currently used as the main tool for examining superficial soft tissues, such as tendons and muscles, because it is cost-effective, accurate, and allows real-time dynamic imaging in the examination room.²² Some physicians (48, 3%) who performed intraarticular injections of the pelvis also used ultrasound as a guide for injection (46%).²³ The use of POCUS has also been considered by some to be the fifth component of a physical examination after inspection, palpation, auscultation, and percussion.²⁴

However, the hospital should not be satisfied with the availability of the equipment it currently has. We recommend that if it wants to make sports medicine services center of excellence, the hospital needs to have equipment that becomes the gold standard, one of which is Cardiopulmonary Exercise Testing (CPET) which is used as the gold standard in assessing aerobic fitness objectively where the exchange of respiratory gases, ventilation, and measurement of heart rhythm are continued,²⁴ with the application of gradually increasing intensity training until fatigue develops or until limiting symptoms and/or signs develop.²⁵

CPET can provide an evaluation of the integrative exercise response of the cardiovascular, respiratory, and metabolic systems with an additional work-rate enabling evaluation of rest, sub-maximal, and peak exercise response, as well as recovery response; provide physicians with relevant information for clinical decision making

such as evaluation of exercise intolerance, eligibility for organ transplantation, and preoperative risk stratification.²⁵

Likewise the availability of the DXA Scan tool which is the gold standard for the diagnosis of body composition which is often compared to chemical analysis, dissection, and anatomy-based imaging methods (CT-Scan or MRI); measurement of muscle mass in a European study,²⁶ and is currently also used in a variety of clinical settings with the prospect of diagnosing osteoporosis, obesity, and sarcopenia.^{26,27}

MRI in sports medicine services is also important as a supporting examination in sports injuries, especially musculoskeletal injuries,^{8,28,29} and occasionally head injuries.³⁰ MRI has been shown to provide an excellent evaluation of the ligaments and tendons, with the ability to show associated intraarticular abnormalities, joint effusions,²⁸ muscle disruption, and edema or the presence of intramuscular adipose tissue/fibrosis.³¹

3 Tesla or 1.5 T optimized MRI allows the presence of muscle injury to be determined with excellent resolution, and allows acquisition in three planes, including inclined planes, and assessment of deep muscles. In elite athletes, MRI is considered the imaging modality of choice for predicting when athletes can return to play after an acute muscle injury, along with a variety of other player-related factors, as well as predicting the timing of sports training after a player has sustained an injury.²⁹ Therefore, the hospital management should consider providing this equipment in the future.

Thus, in an effort to improve and develop sports medicine services, the hospital is expected to gradually complete the manpower and equipment needed to support sports medicine services.

CONCLUSION AND RECOMMENDATION

Hospital has provided personnel and equipment that are relatively complete and in accordance with the literature study. Sports psychologists, MRI, and several equipments that have become gold standards such as CPET and DXA Scan should become a plan for the development of sports medicine services so that they can be fulfilled in the future as well. In this study, it has been described how the availability of personnel and equipment in hospitals that provide sports

medicine services. However, one of the shortcomings in this study is that it only looks at one hospital location so that it is not sufficient to describe the condition of personnel and equipment at other hospital locations.

It is hoped that the next research can take more hospital locations, if necessary from different hospital classes. In addition, further research is also expected to be able to take more informants who represent various professions in the field of sports medicine, especially professions whose opinions have not been adequately represented in this study so as to get a more comprehensive picture of how the suitability of personnel and equipment that the hospital has with existing literature studies.

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