

VALUE ADDED COURSE

1. Name of the programme & (Code)

Doping (FMT- VAC 09)

2. Duration & Period

30 hrs & July 2019 to December 19 and Jan 2020 to June 2020

3. Information Brochure and Course Content of Value Added Courses

Enclosed as Annexure- I

4. List of students enrolled

Enclosed as Annexure- II

5. Assessment procedures:

Multiple choice questions- *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

7. No. of times offered during the same year:

2

8. Year of discontinuation: 2020

9. Summary report of each program year-wise

Value Added Course- July 2019 - June 2020					
Sl. No	Course Code	Course Name	Resource Persons	Target Students	Strength & Year
1	FMT-09	Doping	Dr. S.N.Rathod	2 nd MBBS	20 (July 2019 – Dec2019)
2	FMT-09	Doping	Dr. S.N.Rathod	2 nd MBBS	20 (Jan 2020- June2020)

10. Course Feed Back

Enclosed as Annexure- V

RESOURCE PERSON

COORDINATOR

DOPING

PARTICIPANT HAND BOOK

COURSE DETAILS

Particulars	Description
Course Title	Doping
Course Code	FMT VAC 09
Objective	1. Introduction to Doping 2. Most common doping substances and techniques 3. Other at risk populations for doping 4. Overview and different trends of doping 5. Anabolic steroids 6. Human Growth Hormone
Further learning opportunities	Forensic aspects of doping and Pharmacology
Key Competencies	On successful completion of the course the students should be able to diagnose and investigate doping related issues
Target Student	2 nd yr MBBS Students
Duration	30hrs Every July 2019– Dec 2019 & Jan 2020 – June 2020
Theory Session	22hrs
Practical Session	8 hrs
Assessment Procedure	Multiple choice questions

1.Introduction to doping:

Doping is now a global problem that follows international sporting events worldwide. International sports federations, led by the International Olympic Committee, have for the past half century attempted to stop the spread of this problem, with little effect. It was expected that, with educational programs, testing, and supportive medical treatment, this substance-abusing behavior would decrease. Unfortunately, this has not been the case. In fact, new, more powerful and undetectable doping techniques and substances are now abused by professional athletes, while sophisticated networks of distribution have developed. Professional athletes are often the role models of adolescent and young adult populations, who often mimic their behaviors, including the abuse of drugs. This review of doping within international sports is to inform the international psychiatric community and addiction treatment professionals of the historical basis of doping in sport and its spread to vulnerable athletic and non-athletic populations.

The creed of the Olympics states: "The important thing in the games is not winning but taking part. The essential thing is not conquering, but fighting well". As noble a goal as this is, it has little to do with the reality of the modern sports world. Athletes are rewarded for winning at virtually every level of competition. Second place is viewed as the "first loser". A coach's job security is directly related to his team's success, not that they are simply "fighting well". Given this reality, it is not surprising that athletes and coaches will sacrifice and risk a great deal in order to obtain a competitive edge and enhance performance at all costs. Performance enhancement in olympic and professional sport has now become a medical, ethical, and legal problem for modern athletes and athletic organizations. This is primarily due to the amount of money associated with winning in today's sports industry. Multimillion dollar contracts, appearance fees, international endorsement and sports merchandising represent a billion dollar industry that offers today's athletes, their sponsors and entourage previously unheard of financial gains. When Sports Illustrated interviewed a cohort of elite olympic athletes, one of the questions was: "If you were given a performance enhancing substance and you would not be caught and win, would you take it?". 98% of the athletes responded "Yes". The more chilling question was: "If you were given a performance enhancing substance and you would not be caught, win all competitions for 5 years, then die, would you take it?". More than 50% said "Yes" .

Athletic performance enhancement can be gained using various diets, training routines and hard work. However, it can and has been achieved since ancient competitions by using a wide variety of physiological, mechanical and pharmacological doping techniques. As prize money and endorsement rewards increased, so did the science and abuse of performance-enhancing techniques. Today no sport is spared the cloud of cheating using illegal performance enhancement. Driven by the millions of dollars now routinely available for winning a sporting event, unethical pharmacists, medical professionals, trainers and sports organizations have worked secretly, and at times without their athletes' consent, to develop sophisticated doping programs where performance is optimized, often at the risk of the athletes' health. Now, these same doping programs are moving out of the professional sports market to our youth and other at-risk populations at alarming rates.

There are several hundred forms of known and potentially more unknown doping substances and techniques abused by professional athletes worldwide. This review will provide a summary of the history of doping in sport, and focus on the most commonly abused substances: anabolic androgenic steroids, human growth hormone (hGH) and erythropoietin (EPO).

2. Most common doping substances and techniques:

There are literally hundreds of known doping substances and an equal number of designer, veterinary, and yet to be identified drugs and techniques abused in sports today. The 2006 WADA list of prohibited substances includes the following major categories: anabolic agents (i.e., exogenous anabolic androgenic steroids such as androstendiol, boldenone, clostebol and danazol; endogenous anabolic androgenic steroids such as dihydroxytestosterone and testosterone, and other anabolic agents such as clenbuterol and tibolone); hormones and related substances (i.e., EPO, hGH, insulin-like growth factors, mechano growth factors, gonadotropins, insulin and corticotrophins); beta-2 agonists (i.e., terbutaline, salbutamol, etc.); agents with anti-estrogenic activity (i.e., anastrozole, letrozole, clomiphene, etc.); diuretics (furosemide, hydrochlorothiazide, etc.) and other masking agents (such as epitestosterone, probenecid, plasma expanders, etc.); stimulants (amphetamines, ephedrine, cocaine, etc.); narcotics (morphine, oxycodone, etc.); cannabinoids (marijuana, hashish), and glucocorticosteroids (allowed externally but not internally). WADA also lists prohibited methods, including enhancement of oxygen transfer (blood doping, efaproxal, etc.), chemical and physical manipulation (tampering or substitution of sample) and gene doping. In addition, WADA prohibits alcohol and beta-blockers (in specific sports: archery, billiard, etc.).

Testing for the above list of compounds is technically challenging, expensive and only performed by about 35 WADA-accredited laboratories worldwide. Steroids are still the most detected performance-enhancing drugs by WADA laboratories. However, because of the limitations of laboratory technology and sophistication of doping athletes to avoid detection, they may not be the most abused.

Anabolic androgenic steroids:

Anabolic androgenic steroids are naturally occurring male hormones involved in a wide range of physiological functions. Simply referred to as "steroids", they fall into two categories: endogenous or naturally occurring, like testosterone, and exogenous or synthetic, like danazol.

In 1923 Bob Hoffman formed the famous York Barbell Company in the United States. A dominant figure in US weightlifting, he published the *Strength and Health* magazine and sold health and food supplements in his gym. As a weightlifting coach, his success led to him being named the head coach of the US Olympic weightlifting team. At the 1954 World Championships in Vienna, he met with a Soviet colleague who told him of a synthetic form of testosterone developed by the Nazis which produced dramatic improvements in strength and power. He and his colleagues contacted Ciba Pharmaceuticals in pursuit of synthetic testosterone. Ciba had conducted a number of studies on the use of synthetic testosterone in pain patients and the physically disabled. This resulted in the development of danazol, which rapidly became a doping substance abused by weightlifters.

Although steroids were first reported to be abused in Olympic sports in the 1950s, the abuse of steroids in young male non-Olympic athletes was not reported until the 1980s. As demand increased, trafficking steroids at schools and gyms became common and the use of steroids was seen in younger and younger populations. Steroid sources included doctors, trainers, friends, the black market and foreign suppliers. In the United States, the Anabolic Steroid Enforcement Act of 1990 brought anabolic steroids under the record-keeping, reporting, security, prescribing, import and controls of the Controlled Substances Act. All manufacturers and distributors of steroids were required to register with the Drug Enforcement Agency. Other countries have similar laws on the manufacture and dispensing of steroids. However, the amount of illegal steroids entering the United States and distributed to athletic and at-risk populations has increased dramatically. It is now estimated to be an over 100 million US dollar black market for steroids in the US alone, with more than 80% manufactured in Mexico. Projecting these figures internationally suggests that the illegal steroid market alone approaches a billion US dollars annually, clearly making it a public health concern, especially for at-risk groups.

The serious side effects of steroids described in the medical literature include liver function abnormalities, liver and kidney tumors, endocrine and reproductive dysfunctions, testicular atrophy, lipid and cardiac effects and psychiatric symptoms. These consequences are exaggerated with the common doping practices using ten times or more the recommended medical dose, and multiple drugs or "stacking", e.g., steroids and EPO or hGH. Added to this, a new problem has emerged with the manufacture of "counterfeit" drugs by unregulated pharmacies, which are tainted with impurities, contain no medication, or are potentially harmful. Now, more so than in the past, when an athlete buys performance-enhancing drugs from a friend or at the gym, he will never know exactly what is being bought or taken. Steroids are sold on the internet ranging in price from \$50 to \$200 per regime, depending upon the type of steroid and doping program selected. These black market steroids may or may not contain any medication at all or may contain harmful material. Testing for steroids in urine is available at a few commercial clinical laboratories in the United States and can be obtained in the price range of \$100-\$200/test, depending upon the number of steroids screened.

Human growth hormone (hGH and rhGH)

hGH is a naturally occurring hormone produced by the anterior pituitary gland and is one of the major hormones influencing growth and development. Harvey Cushing discovered the hormone in 1912 and isolated it from human and monkey cadaver brains in 1956. Two years later it was used to treat dwarfism in children by injection. The unfortunate development of Creutzfeldt-Jakob disease, a degenerative brain disorder, in boys who were treated with cadaver growth hormone led to the discontinuation of all products derived from the human pituitary gland. Because of this ban, the abuse of hGH was rare in sport until the middle to the end of the 1980s. In 1985 Genentech received approval from the US Food and Drug Administration (FDA) to market Protropin for children with growth hormone deficiency. This was the first recombinant DNA form of growth hormone (rhGH) that was safer than cadaver extracts used in the past. Recombinant DNA technology made the production of pharmaceutical grade growth hormone easier and cheaper. Genetically engineered rhGH is now marketed as Nutropin, Humatrope, Genotropin, Norditropin, Saizen, and Tev-Tropin. Most human growth hormone used in medicine and diverted to sports doping is now obtained by recombinant technology, and is simply referred to as hGH (but it may also appear as rhGH or HGH).

Unfortunately, cadaver extracts of pituitary hGH may still be in circulation. It has been reported that a Russian coach was arrested and, upon searching his apartment in Moscow, over 1000 cadaver pituitary glands were found preserved in a large container . Moreover, the problem of counterfeit drugs also exists with hGH: illegal pharmaceutical manufacturers are now flooding the black market with hGH vials of unknown quality and safety. It is estimated that an eight week performance enhancement regime of pharmaceutical grade rhGH will cost about \$2000, well out of the range of an adolescent and the majority of weekend athletes. However, the increased trafficking of low cost counterfeit rhGH will create interest and experimentation in these at-risk populations. hGH is marketed on the internet in many forms: pills, drops and aerosol formulations; most are ineffective and shams. The normal route of administration of hGH is injection, posing an additional health risk of infection from non-sterile counterfeit drugs and the risk of HIV and hepatitis transmission caused by shared needles.

Olympic, professional and weekend athletes abuse hGH because of unsubstantiated reports that it is as effective as anabolic steroids with fewer side effects. They often abuse hGH as a steroid substitute to prevent loss of muscle after discontinuing the use of steroids. Ben Johnson admitted to using hGH along with steroids during investigations after his disqualification in Seoul. According to some controlled scientific studies, hGH does not increase muscle strength. Nevertheless, the abuse of hGH in sports is escalating, with large caches of needles and vials of hGH being confiscated at sporting events worldwide. Six months prior to the 2000 Olympic Games, a pharmacy in Sydney was broken into and 1,575 multiple dose vials of hGH were taken while nothing else was touched. Also, on their way to Australia, the Chinese swimming team were detained, as needles, syringes, and vials of hGH were found by customs officials in their baggage.

Using hGH may lead to life-threatening health conditions, especially since some estimates report that athletes who use hGH to enhance performance are taking 10 times the therapeutic dosage. Some reported side effects of hGH are abnormal bone growth, hypertension, cardiovascular disease, cardiomyopathy, glucose intolerance, colonic polyps, decreased life span, and cancer .

Since hGH is a naturally-produced hormone and rhGH is similar in structure, testing for doping with rhGH has been a technical challenge only recently solved by WADAcertified laboratories. Routine blood tests for hGH available at clinical laboratories will not differentiate hGH from rhGH and are of no value in determining if an adolescent or weekend athlete is doping.

Erythropoietin (EPO):

EPO is a naturally occurring hormone produced by the kidney that stimulates red blood cell production in the bone marrow in response to low circulating oxygen levels. It was not until 1977 that it was identified and extracted from human urine. This was concurrent with the development of recombinant DNA technology, and in 1989 Epogen was released in the United States and approved for the treatment of anemia. Procrit was licensed in 1991 for the treatment of chemotherapy-induced anemia. European formulations include Aranesp, Eprex and NeoRecorman.

EPO abuse in sport was believed to start as soon as the drug was available as a replacement for the older, more complex and dangerous doping technique referred to as "blood doping". In this technique an athlete donates his own blood several months before a competition, stores it and transfuses it back into himself prior to competing. This technique is fraught with problems and

health risk. EPO accomplishes this same effect by increasing red blood cells, which results in more oxygen in circulation. It was in 1998 at the Tour de France that French customs arrested Willy Voet, a physiotherapist of the Festina cycling team, for the illegal possession of needles, syringes and over 400 bottles containing EPO, hGH, steroids, amphetamines, narcotics and stimulants.

EPO used for medical treatments can cost thousands of US dollars a month and is administered by intravenous or subcutaneous injection. As with steroids and hGH, doping with EPO is often injected in supnormal doses that could cause increased blood viscosity, deep vein and coronary thromboses, cerebral thromboses, pulmonary embolism, arrhythmias, stroke and death. It has been estimated that 20 European cyclists have died since 1987 due to abuse of EPO, making it one of the most deadly doping agents. The genetically engineered form of EPO is indistinguishable from naturally occurring EPO, making routine blood testing useless to determine if an athlete is doping. At the 2000 Olympic Games in Sydney, the Australian WADA-certified laboratory first launched a sophisticated anti-doping test for EPO that required both urine and a blood sample. Over 300 tests were performed for EPO for the first time in Olympic history and no positives were reported. This could be due to the fact that the technology for the test was new and questions still existed about the assay.

3. Other at risk populations for doping:

Given the above history and current state of knowledge, it is not difficult to understand why there would be over a million abusers of steroids in the United States youth alone. Unlike professional athletes, these at-risk users will not have fame and fortune as a result of using steroids, only the side effects.

Pioneering studies in this area were done by Buckley et al in the early 1980s, when they interviewed 3403 male high school seniors nationwide. Their results reported in 1988 indicated that 6.6% of respondents had used steroids and more than two-thirds of the group started using steroids when they were 16 years old or younger. Twenty percent reported that health professionals were the primary source for obtaining steroids and 38% used injectable steroids. Pope et al studied 1,010 college men for use of steroids and also reported their findings in 1988. The study found that only 2% of the respondents reported using steroids. The authors qualified their finding as potentially underestimating the true prevalence of steroid abuse. However, it is interesting to note that this study found that 25% of those reporting using steroids were not athletes. They abused steroids to improve personal appearance, a problem that continues today and is fueled by the media and "anti-aging" marketing. A review of published reports concluded that 3-12% of high school students used steroids, and of the group of abusers about half were adolescent females.

Contrary to popular belief and supported by Pope's early findings, steroid abuse is not exclusively related to performance enhancement. DuRant et al reported in 1993 that steroid abuse in ninth graders was associated with use of cocaine, injected drugs, alcohol, marijuana, cigarettes and smokeless tobacco. They then reviewed the 1991 Centers for Disease Control and Prevention Youth Risk Behavior Survey of over 12,272 male and female public and private high school students, and confirmed the earlier finding that there is an association between steroid abuse and multiple drug abuse. In a later review of the 1997 Centers for Disease Control and Prevention Youth Risk Behavior Survey of 16,262 high school students, Miller et al reported no significant correlation in male or female steroid-abusing high school students with physical activity, nor were athletic participation or

strength conditioning alone associated with lifetime steroid abuse . Rather, they found that athletic participation was less of a factor than behavior problems such as substance abuse, fighting, binge drinking, tobacco use and high risk sexual behavior. They suggested steroid abuse may be part of a much larger syndrome of problem behaviors. In 2002, Irving et al confirmed Miller's report that physical activity was not associated with steroid abuse. This group shed light on the fact that male and female adolescent steroid abuse may also be associated with unhealthy attitudes and behaviors to lose, gain or control weight and body shape . Clancy and Yates reported that steroid abusers may have a unique set of clinical differences and are distinct from other drug abusers . Bahrke et al associated a number of personal high-risk behaviors and other factors with a partially developed profile of an adolescent anabolic steroid abuser.

What has become evident is that not only high school and weekend athletes are potential steroid abusers. Steroid abuse may also include a wider population of non-athletes who have behavioral problems and may experiment with these now easily available performance-enhancing drugs. Their motivation may not be athletic enhancement, but rather cosmetic and body shaping purposes. To maintain youthful appearances, weekend athletes may experiment with hormones encouraged by "anti-aging" marketing, while adolescent females desirous of the long, lean female media images of "adult women" may use steroids and hGH to reduce fat and increase muscle tone.

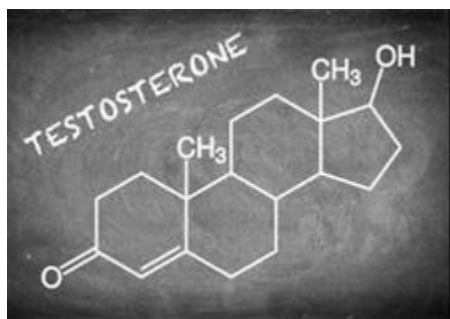
4.Overview and different trends of Doping: Modern sports and the media's misplaced fixation on fame, fortune and winning at all costs have unintentionally created a growing market for doping substances. These substances, once only abused by elite athletes, are clearly spreading into our schools and health clubs worldwide. They are being accepted by a whole new generation of young customers who see reports daily in the newspapers of sports icons accused of abusing drugs only to continue playing, breaking records and claiming fortunes. These same performance-enhancing drugs are also abused by adolescents and weekend athletes and non-athletes who have wider behavioral and health risk problems. In addition, these drugs are now being abused by male and female adolescents for cosmetic purposes in an attempt to achieve the "cut" and sexy look promoted by the media. Continuing educational programs developed for these at-risk populations by national olympic organizations and athletic federations are important first steps to curb these dangerous behaviors . Testing for performance-enhancing drugs in high schools as a means of early detection, intervention and prevention is now being launched in New Jersey, with other states following their lead. Medical professionals, teachers, coaches and sports organizations must all be made aware of this continuing problem in our adolescent and at-risk populations and contribute to its solution by open, honest discussion. Most importantly, professional athletes must serve as role models and spokesmen for drug-free sport and lifestyle. This position must be actively supported by the media, owners of teams and international sports federations by providing consistent leadership and advocacy of anti-doping programs in sport, regardless of costs and consequences. Accepting the magnitude of doping in at-risk populations and developing education, prevention and treatment programs is the only way we can prevent the continuing spread of the abuse of doping in sport and its spread into the most fragile groups in our society, our youth and at-risk populations.

5. Anabolic steroids:

Anabolic steroids are synthetic, or human-made, variations of the male sex hormone testosterone. The proper term for these compounds is *anabolic-androgenic steroids*. "Anabolic" refers to muscle building, and "androgenic" refers to increased male sex characteristics. Some common names for anabolic steroids are Gear, Juice, Roids, and Stackers.

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Image



Health care providers can prescribe steroids to treat hormonal issues, such as delayed puberty. Steroids can also treat diseases that cause muscle loss, such as cancer and AIDS. But some athletes and bodybuilders misuse these drugs in an attempt to boost performance or improve their physical appearance.

The majority of people who misuse steroids are male weightlifters in their 20s or 30s. Anabolic steroid misuse is much less common in women. It is difficult to measure steroid misuse in the United States because many national surveys do not measure it. However, use among teens is generally minimal. The 2016 NIDA-funded Monitoring the Future study has shown that past-year misuse of steroids has declined among 8th and 10th graders in recent years, while holding steady for 12th graders.

How do people misuse anabolic steroids?

People who misuse anabolic steroids usually take them orally, inject them into muscles, or apply them to the skin as a gel or cream. These doses may be 10 to 100 times higher than doses prescribed to treat medical conditions.

Common patterns for misusing steroids include:

- cycling—taking multiple doses for a period of time, stopping for a time, and then restarting

- stacking—combining two or more different steroids and mixing oral and/or injectable types
- pyramiding—slowly increasing the dose or frequency of steroid misuse, reaching a peak amount, and then gradually tapering off to zero
- plateauing—alternating, overlapping, or substituting with another steroid to avoid developing a tolerance

There is no scientific evidence that any of these practices reduce the harmful medical consequences of these drugs.

How do anabolic steroids affect the brain?

Anabolic steroids work differently from other drugs of abuse; they do not have the same short-term effects on the brain. The most important difference is that steroids do not directly activate the reward system to cause a “high”; they also do not trigger rapid increases in the brain chemical dopamine, which reinforces most other types of drug taking behavior.

Misuse of anabolic steroids might lead to negative mental effects, such as:

- paranoid (extreme, unreasonable) jealousy
- extreme irritability and aggression (“roid rage”)
- *delusions*—false beliefs or ideas
- impaired judgment
- mania

What are other health effects of anabolic steroids?

Anabolic Steroids and Infectious Diseases

People who inject steroids increase their risk of contracting or transmitting HIV/AIDS or hepatitis.

Aside from mental effects, steroid use commonly causes severe acne. It also causes the body to swell, especially in the hands and feet.

Long-Term Effects

Anabolic steroid misuse might lead to serious, even permanent, health problems such as:

- kidney problems or failure

- liver damage and tumors
- enlarged heart, high blood pressure, and changes in blood cholesterol, all of which increase the risk of stroke and heart attack, even in young people
- increased risk of blood clots

Several other effects are gender- and age-specific:

- In men:
 - shrinking testicles
 - decreased sperm count
 - baldness
 - development of breasts
 - increased risk for prostate cancer
- In women:
 - growth of facial hair or excess body hair
 - decreased breast size
 - male-pattern baldness
 - changes in or stop in the menstrual cycle
 - enlarged clitoris
 - deepened voice
- In teens:
 - stunted growth (when high hormone levels from steroids signal to the body to stop bone growth too early)
 - stunted height (if teens use steroids before their growth spurt)

Some of these physical changes, such as shrinking sex organs in men, can add to mental side effects such as mood disorders.

6. Human Growth Hormone:

GH is banned by the World Anti-Doping Agency as a performance-enhancing anabolic agent. Doping with GH likely began in the early 1980s and became more prevalent with the advent of recombinant technology well before any scientific evidence of benefit. The expectation that GH improves physical function stems from its anabolic and lipolytic properties. Athletic performance depends on muscle strength and the energy required to power muscle function. In recreational athletes, GH selectively improves anaerobic sprint capacity but has not been proven to significantly enhance muscle strength, power, or maximum rate of oxygen consumption. GH is secreted as a family of isoform peptides in a pulsatile manner reflecting intermittent secretion and rapid clearance. Its anabolic actions are largely mediated by IGF-I, which stimulates whole-body protein synthesis, including skeletal muscle and collagen proteins. Two methods have been validated for detecting GH abuse in athletes. The first (the isoform method) is based on distinguishing pure recombinant 22-kDa GH from the heterogeneous isoforms secreted from the pituitary. The second (the marker method) is based on measuring blood levels of GH-responsive proteins, specifically IGF-I and the N-terminal propeptide of type III collagen (P-III-NP). Only a handful of athletes have been caught since the implementation of GH doping tests in 2004. The low rate likely reflects the limitation of in-competition testing using current methods. Improved detection rates may be achieved by more out-of-competition testing, introducing athletes' biological passports, and the development of novel methods. Governance, operational, technical, and political factors influence the effectiveness of an anti-doping program.

Effects on Physical Performance:

This section reviews the outcomes of GH supplementation in athletes on four of the most common measures of physical performance: strength, power, endurance, and sprint capacity. We provide information on the assessment methodologies and select double-blind placebo control trials for analysis, unless otherwise stated.

Muscle strength:

Muscle strength is defined as maximal force (in newtons) or torque (in newton-meters) that is generated by a muscle or a group of muscles during maximal voluntary contraction. The force is determined by fast-twitch type II muscle fibers relying on preformed ATP for energy. Muscle strength is commonly assessed by measuring the force or torque produced during an isometric or isokinetic contraction. Isometric strength is the maximal voluntary contraction that can be developed against an immovable object without a change in joint angle, whereas isokinetic strength is a measure of torque/force through a range of motion in which the limb is moving at a constant velocity.

There is clear evidence that long-term replacement of GH normalizes muscle strength in adults with GH deficiency who have reduced isometric and isokinetic muscle strength. Whether the benefits are also seen in fit young adults has been investigated in three double-blind, placebo-controlled studies involving 83 healthy young adults treated with ~2 to 3 mg/d of GH for between 6 and 12 weeks.

These studies assessed biceps strength , quadriceps strength , the strength of seven muscle groups , and isometric dead lift. These studies reported no significant effect of GH on muscle strength.

Effect on power:

Muscle power is defined as work performed per unit of time and is expressed in joules per second or watts. It is described in terms of aerobic and anaerobic power, depending on which energy source is predominantly used to do the work. Thus, muscle power can be assessed by measuring aerobic exercise capacity and anaerobic exercise capacity.

Aerobic exercise capacity:

Aerobic exercise capacity is a measure of endurance, that is, the muscle's ability to sustain work for a prolonged period with energy provided principally from mitochondrial oxidation of substrates. In the athletic world, it supports activities such as a marathon, football, and tennis, whereas in day-to-day life, it relates to activities such as walking. It is determined by the measurement of maximum rate of oxygen consumption ($\text{Vo}_2 \text{ max}$) in L/min or mL/kg/min or maximal aerobic power output in watts or kilojoules during an incremental exercise test on a cycle ergometer or a treadmill.

Numerous double-blind, placebo-controlled and long-term open label trials have reported the positive effects on aerobic exercise capacity in adults with GH deficiency . However, there is no convincing evidence that $\text{Vo}_2 \text{ max}$ is affected by GH treatment in healthy young adults . Based on a review of three double-blind, placebo-controlled studies assessing GH treatment in >100 participants with doses of ~2 to 3 mg/d, there was no treatment effect over placebo. The data indicate that GH supplementation in the doses used do not improve cardiorespiratory and muscle function in young healthy adults. Interestingly, in a double-blind, placebo-controlled, randomized trial in 56 recreational athletes, the administration of rhIGF-I combined with rhIGFBP3 led to a 7% increase in $\text{Vo}_2 \text{ max}$ with no significant change in body composition . The reasons for the different outcomes between GH and IGF-I supplementation are unknown but merit further study.

Anaerobic exercise capacity:

Anaerobic exercise capacity is defined as the total amount of work performed during a maximal exhausting exercise of a short duration that is powered by ATP supplied under anaerobic conditions. The Wingate test, which measures maximal power output during 30 seconds by cycle ergometry, is a widely used test of anaerobic capacity. Sporting activities that require short-term, high-intensity physical activity, such as sprinting, require considerable energy support from anaerobic ATP. All physical activities including activities of daily living also depend on anaerobic energy for initiation, for the first few seconds, before aerobic metabolism becomes the predominant energy source. Only one study has investigated the effects of GH on anaerobic exercise capacity. This double-blind, placebo-controlled study in recreational athletes reported a significant improvement of 3.8% in anaerobic exercise capacity after GH therapy for 8 weeks, as assessed by the Wingate test. When translated to proportionate time reductions, the 3.8% could equate to an improvement of 0.4 second in a 10-second sprint of 100 m or of 1.2 seconds in a 30-second swim of 50 m. This improvement occurred without a significant change in body cell mass or in muscle strength and power (jump height), suggesting that muscle anabolism is unlikely to explain the improvement in sprint capacity. Jump height represents instantaneous work whereas the Wingate test involves all-

out intensive exercise on a cycle ergometer for 30 seconds. Although both tests measure anaerobic power, the energy required for jumping is drawn from phosphocreatine stores whereas that for the longer Wingate test is drawn from phosphocreatine stores and ATP derived from glycolysis.

Stimulation of ATP generation from anaerobic glycolysis enhances the production of lactate. The finding of higher lactate concentrations in people undergoing evaluation of physical capacity after GH treatment provides evidence that the anaerobic energy system is stimulated by GH. In a study, GH treatment significantly improved sprint capacity without affecting muscle strength or aerobic capacity in the same athletes under the same conditions. Along with previous studies in athletes reporting that GH treatment did not improve muscle strength or endurance, the collective evidence indicates that GH exerts a selective ergogenic effect on sprint capacity.

BIHER

SLIMS

VALUE ADDED COURSE

Doping FMT VAC 09

4. List of Students Enrolled January 2020– June- 2020

2nd Year MBBS Student		
Sl. No	Name of the Student	Reg No
1	SUGANTHI CLARET D	U19MB381
2	SUJANA P	U19MB382
3	SURYAKANT BHARDWAJ	U19MB383
4	SUSHREE SANGEETA	U19MB384
5	SWATHI V	U19MB385
6	SWETHA HARIKUMAR	U19MB386
7	TANYA PACHORY	U19MB387
8	THENNARASU V A	U19MB388
9	TRIYAN HARSHIL SINGH	U19MB389
10	UBANISHA A	U19MB390
11	UGARSAN P	U19MB391
12	VAISNAVI R	U19MB392
13	VIJAY A M	U19MB393
14	VIJITHA VIJAYAN	U19MB394
15	VIMALAN D	U19MB395
16	VISHNUDEVAN V	U19MB396
17	R VISHVESHWER	U19MB397
18	XAVIER VASANTHA MARTINO P	U19MB398
19	YUKESH KANNA T	U19MB399
20	ZABIULLAH K A	U19MB400

RESOURCE PERSON

COORDINATOR

VALUE ADDED COURSE

Doping FMT VAC 09

4. List of Students Enrolled July 2019– December- 2019

2nd Year MBBS Student		
Sl. No	Name of the Student	Reg No
1	SHREYASEE CHATTOPADHYAY	U18MB371
2	SHRI KIRTI RAAJA	U18MB372
3	SNEKA SE	U18MB373
4	SONALI HESSA	U18MB374
5	SOUMITRA MOHANTY	U18MB375
6	SREEHARI S NAIR	U18MB376
7	SREELEKSHMI S NAIR	U18MB377
8	SREENIDHI N B	U18MB378
9	SUBALAKSHMI V	U18MB379
10	SUDHARSAN .S	U18MB380
11	SUHAIL AHMAD	U18MB381
12	SUMAN KALYAN SAHOO	U18MB382
13	SUSMITA KHAN	U18MB383
14	SWAPNIL	U18MB384
15	SWARNAB JANA	U18MB385
16	SWATHI .K	U18MB386
17	TADAR YAMING	U18MB387
18	TECHI NADAM	U18MB388
19	THENDRAL NILAVAN .M	U18MB389
20	TINA CAROLINE J	U18MB390

RESOURCE PERSON

COORDINATOR



SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION AND RESEARCH

Annexure - IV

DOPING

MULTIPLE CHOICE QUESTIONS

Course Code: FMT 09

I. ANSWER ALL THE QUESTIONS

- 1) Anabolic Steroids benefit performance by
 - a) increasing heart and respiratory rates and suppressing the symptoms of fatigue
 - b) having a painkilling and sedating effect
 - c) releasing hormones promoting growth, healing and body repair
 - d) preventing the release of adrenaline

- 2) Stimulants benefit performance by
 - a) increasing heart and respiratory rates and suppressing the symptoms of fatigue
 - b) having a painkilling and sedating effect
 - c) releasing hormones promoting growth, healing and body repair
 - d) preventing the release of adrenaline

- 3) Some of the side effects of using anabolic steroids include
 - a) suppressed appetite, increased blood pressure and body temperature
 - b) addiction, suppressed appetite, toxicity
 - c) impotency, infertility, arteriosclerosis, heart disease, liver and kidney cancer
 - d) a damaging affect on endurance, heart disease

- 4) Sports which are well known for the use of diuretics
 - a) Endurance Cycling
 - b) Boxing
 - c) Soccer
 - d) Football

- 5) EPO is
 - a) A hormone and widely used by endurance athletes
 - b) A steroid and widely used by endurance athletes
 - c) A hormone and widely used by power athletes



SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION AND RESEARCH

- d) A steroid and widely used by power athletes

- 6) Codeine is an example of
 - a) Diuretics
 - b) Stimulants
 - c) Narcotic analgesics
 - d) Betablockers

- 7) Some of the side effects of using Betablockers include
 - a) suppressed appetite, increased blood pressure and body temperature
 - b) addiction, suppressed appetite, toxicity
 - c) impotency, infertility, arteriosclerosis, heart disease, liver and kidney cancer
 - d) a damaging affect on endurance, heart disease

- 8) Some of the side effects of using narcotic analgesic include
 - a) suppressed appetite, increased blood pressure and body temperature
 - b) addiction, suppressed appetite, toxicity
 - c) impotency, infertility, arteriosclerosis, heart disease, liver and kidney cancer
 - d) a damaging affect on endurance, heart disease



Sri Lakshmi Narayana Institute of Medical Sciences

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CERTIFICATE OF MERIT

This is to certify that _____ has
actively participated in the Value Added Course on *Doping* held during July 2019 –
December 2019 Organized by Sri Lakshmi Narayana Institute of Medical Sciences,
Pondicherry- 605 502, India.

Dr.S.N.Rathod
RESOURCE PERSON

Dr. Jayalakshmi
COORDINATOR

Student Feedback Form

Course Name: **Doping**

Subject Code: **FMT VAC 09**

Name of Student: _____ Roll No.: _____

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear					
2	Course contents met with your expectations					
3	Lecturer sequence was well planned					
4	Lectures were clear and easy to understand					
5	Teaching aids were effective					
6	Instructors encourage interaction and were helpful					
7	The level of the course					
8	Overall rating of the course	1	2	3	4	5

** Rating: 5 – Outstanding; 4 - Excellent; 3 – Good; 2– Satisfactory; 1 - Not-Satisfactory*

Suggestions if any:

Date:

Signature



Sri Lakshmi Narayana Institute of Medical Sciences

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Date: 2nd January 2020

From
Dr. S.N. Rathod,
Professor and Head,
Department of Forensic Medicine,
Sri Lakshmi Narayana Institute of Medical Sciences,
Bharath Institute of Higher Education and Research,
Chennai.

To
The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences,
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: Doping

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: **Doping** from January 2020 – June 2020. We solicit your kind permission for the same.

Kind Regards

Dr. S.N. Rathod

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:

The Dean:

The HOD:

The Expert:

The committee has discussed about the course and is approved.

Dean

(Sign & Seal)

Subject Expert

(Sign & Seal)

HOD

(Sign & Seal)



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Circular

3rd January 2020

Sub: Organising Value-added Course: Doping

With reference to the above mentioned subject, it is to bring to your notice that Sri Lakshmi Narayana Institute of Medical Sciences, **Bharath Institute of Higher Education and Research**, is organizing **Doping**(January 2020 to June 2020).

The application must reach the institution along with all the necessary documents as mentioned. The hard copy of the application should be sent to the institution by registered/ speed post only so as to reach on or before January 17th 2020. Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

Encl: Copy of Course content and Registration form.



Course Proposal

Course Title: Doping

- Course Objective:**
1. Introduction to Doping
 2. Most common doping substances and techniques
 3. Other at risk populations for doping
 4. Overview and different trends of doping
 5. Anabolic steroids
 6. Human Growth Hormone

Course Outcome: On successful completion of the course the students will be able to diagnose and investigate and manage doping related issues.

Course Audience: 2nd year MBBS student

Course Coordinator: Dr. Jayalakshmi

Course Faculties with Qualification and Designation:

1. Dr. S.Prasanth Kumaran MBBS, MD (Forensic Medicine),
Assistant Professor

Course Curriculum/Topics with schedule (Min of 30 hours)

S.No	Date	Topic	Time	Hours
1	14-01- 20	Introduction to doping	2 pm to 5 pm	3
2	28-01- 20	Most common doping substances and techniques	2 pm to 5 pm	3
3	11-02- 20	Most common doping substances and techniques	2 pm to 5 pm	3
4	25-02- 20	Other at risk populations for doping	2 pm to 5 pm	3
5	08-03- 20	Overview of doping	2 pm to 5 pm	3
6	22-03- 20	Different trends of doping	2 pm to 5 pm	3
7	13-04- 20	Anabolic steroids-overview	2 pm to 5 pm	3



Sri Lakshmi Narayana Institute of Medical Sciences

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8	27-04-20	Anabolic steroids- overview	2 pm to 5 pm	3
9	24-05-20	Human growth hormone -overview	2 pm to 5 pm	3
10	08-06-20	Human growth hormone –overview	2 pm to 5 pm	3
			Total Hours	30

REFERENCE BOOKS: (Minimum 2)

1. Textbook of Doping
2. Handbook of Doping-current trends

Annexure 3

Bharath Institute of Higher Education and Research

Sri Lakshmi Narayana Institute of Medical Sciences,

Participant list of Value added course: **Doping on January 2020 – June 2020**

Sl.No	Reg.No	Name of the candidate	Signature
1.	U19MB381	SUGANTHI CLARET D	
2.	U19MB382	SUJANA P	
3.	U19MB383	SURYAKANT BHARDWAJ	
4.	U19MB384	SUSHREE SANGEETA	
5.	U19MB385	SWATHI V	
6.	U19MB386	SWETHA HARIKUMAR	
7.	U19MB387	TANYA PACHORY	
8.	U19MB388	THENNARASU V A	
9.	U19MB389	TRIYAN HARSHIL SINGH	
10.	U19MB390	UBANISHA A	



Sri Lakshmi Narayana Institute of Medical Sciences

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11	U19MB391	UGARSAN P	
12	U19MB392	VAISNAVI R	
13	U19MB393	VIJAY A M	
14	U19MB394	VIJITHA VIJAYAN	
15	U19MB395	VIMALAN D	
16	U19MB396	VISHNUDEVAN V	
17	U19MB397	R VISHVESHWER	
18	U19MB398	XAVIER VASANTHA MARTINO P	
19	U19MB399	YUKESH KANNA T	
20	U19MB400	ZABIULLAH K A	



Sri Lakshmi Narayana Institute of Medical Sciences

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Course/Training Feedback Form

Course: Doping
Date: January 2020– June 2020
Name:
Reg NO.
Department: Forensic medicine and toxicology

Q 1: Please rate your overall satisfaction with the format of the course:

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 2: Please rate course notes:

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 3: The lecture sequence was well planned

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 4: The lectures were clear and easy to understand

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 5: Please rate the quality of pre-course administration and information:

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 6: Any other suggestions:

Comments:

Thank you for taking the time to complete this survey, your comments are much appreciated.

OPTIONAL Section: Name _____

Signature _____ Date _____



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Date: 12-6-2020

From
Dr. S. N. Rathod
Forensic Medicine & Toxicology
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Through Proper Channel

To
The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Completion of value-added course: Doping

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled **Doping** on January 2020– June 2020. We solicit your kind action to send certificates for the participants, that is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards

Dr. Jayalakshmi

Dr. S.N. Rathod

Encl: Certificates

Photographs



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Annexure 6 - SAMPLE CERTIFICATE TO BE ATTACHED

	Sri Lakshmi Narayana Institute of Medical Sciences Affiliated to Bharath Institute of Higher Education & Research (Deemed to be University under section 3 of the UGC Act 1956)	
<div style="text-align: center;">CERTIFICATE OF MERIT</div>		
<p>This is to certify that _____ has</p> <p>actively participated in the Value Added Course on “Moral Narration” held during July 2018</p> <p>– Dec 2018 Organized by <u>Sri Lakshmi Narayana Institute of Medical Sciences</u>,</p> <p>Pondicherry- 605 502, India.</p>		
<p>Dr. S.N. Rathod RESOURCE PERSON</p>		<p>Dr. Jayalakshmi COORDINATOR</p>



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Date: 2nd July 2019

From
Dr. S.N. Rathod,
Professor and Head,
Department of Forensic Medicine,
Sri Lakshmi Narayana Institute of Medical Sciences,
Bharath Institute of Higher Education and Research,
Chennai.

To
The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences,
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: Doping

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: **Doping** from July 2019 – December 2019. We solicit your kind permission for the same.

Kind Regards

Dr. S.N. Rathod

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:

The Dean:

The HOD:

The Expert:

The committee has discussed about the course and is approved.

Dean

(Sign & Seal)

Subject Expert

(Sign & Seal)

HOD

(Sign & Seal)



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Circular

3rd July 2019

Sub: Organising Value-added Course: Doping

With reference to the above mentioned subject, it is to bring to your notice that Sri Lakshmi Narayana Institute of Medical Sciences, **Bharath Institute of Higher Education and Research**, is organizing **Doping**(July 2019 to December 2019).

The application must reach the institution along with all the necessary documents as mentioned. The hard copy of the application should be sent to the institution by registered/ speed post only so as to reach on or before July 17th 2019. Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

Encl: Copy of Course content and Registration form.



Course Proposal

Course Title: Doping

- Course Objective:**
1. Introduction to Doping
 2. Most common doping substances and techniques
 3. Other at risk populations for doping
 4. Overview and different trends of doping
 5. Anabolic steroids
 6. Human Growth Hormone

Course Outcome: On successful completion of the course the students will be able to diagnose and investigate and manage doping related issues.

Course Audience: 2nd year MBBS student

Course Coordinator: Dr. Jayalakshmi

Course Faculties with Qualification and Designation:

1. Dr. S.Prasanth Kumaran MBBS, MD (Forensic Medicine),
Assistant Professor

Course Curriculum/Topics with schedule (Min of 30 hours)

S.No	Date	Topic	Time	Hours
1	14-07- 19	Introduction to doping	2 pm to 5 pm	3
2	28-07- 19	Most common doping substances and techniques	2 pm to 5 pm	3
3	11-08- 19	Most common doping substances and techniques	2 pm to 5 pm	3
4	25-08- 19	Other at risk populations for doping	2 pm to 5 pm	3
5	08-09- 19	Overview of doping	2 pm to 5 pm	3
6	22-09- 19	Different trends of doping	2 pm to 5 pm	3
7	13-10- 19	Anabolic steroids-overview	2 pm to 5 pm	3



Sri Lakshmi Narayana Institute of Medical Sciences

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8	27-10-19	Anabolic steroids- overview	2 pm to 5 pm	3
9	24-11-19	Human growth hormone -overview	2 pm to 5 pm	3
10	08-12-19	Human growth hormone –overview	2 pm to 5 pm	3
			Total Hours	30

REFERENCE BOOKS: (Minimum 2)

1. Textbook of Doping
2. Handbook of Doping-current trends

Annexure 3

Bharath Institute of Higher Education and Research

Sri Lakshmi Narayana Institute of Medical Sciences,

Participant list of Value added course: **Doping on July 2019 – Dec 2019**

Sl.No	Reg.No	Name of the candidate	Signature
1.	U18MB371	SHREYASEE CHATTOPADHYAY	
2.	U18MB372	SHRI KIRTI RAAJA	
3.	U18MB373	SNEKA SE	
4.	U18MB374	SONALI HESSA	
5.	U18MB375	SOUMITRA MOHANTY	
6.	U18MB376	SREEHARI S NAIR	
7.	U18MB377	SREELEKSHMI S NAIR	
8.	U18MB378	SREENIDHI N B	
9.	U18MB379	SUBALAKSHMI V	
10.	U18MB380	SUDHARSAN .S	



Sri Lakshmi Narayana Institute of Medical Sciences

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11	U18MB381	SUHAIL AHMAD	
12	U18MB382	SUMAN KALYAN SAHOO	
13	U18MB383	SUSMITA KHAN	
14	U18MB384	SWAPNIL	
15	U18MB385	SWARNAB JANA	
16	U18MB386	SWATHI .K	
17	U18MB387	TADAR YAMING	
18	U18MB388	TECHI NADAM	
19	U18MB389	THENDRAL NILAVAN .M	
20	U18MB390	TINA CAROLINE J	



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
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Course/Training Feedback Form

Course: Doping
Date: July 2019– Dec 2019
Name:
Reg NO.
Department: Forensic medicine and toxicology

Q 1: Please rate your overall satisfaction with the format of the course:

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 2: Please rate course notes:

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 3: The lecture sequence was well planned

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

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Q 5: Please rate the quality of pre-course administration and information:

- a. Excellent b. Very Good c. Satisfactory d. unsatisfactory

Q 6: Any other suggestions:

Comments:

Thank you for taking the time to complete this survey, your comments are much appreciated.

OPTIONAL Section: Name _____

Signature _____ Date _____



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Date: 12-12-2019

From
Dr. S. N. Rathod
Forensic Medicine & Toxicology
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Through Proper Channel

To
The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Completion of value-added course: Doping

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled **Doping** on July 2019– Dec 2019. We solicit your kind action to send certificates for the participants, that is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards

Dr. Jayalakshmi

Dr. S.N. Rathod

Encl: Certificates

Photographs



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



Annexure 6 - SAMPLE CERTIFICATE TO BE ATTACHED

	Sri Lakshmi Narayana Institute of Medical Sciences Affiliated to Bharath Institute of Higher Education & Research (Deemed to be University under section 3 of the UGC Act 1956)	
<div style="text-align: center;">CERTIFICATE OF MERIT</div>		
<p>This is to certify that _____ has</p> <p>actively participated in the Value Added Course on “Moral Narration” held during July 2018</p> <p>– Dec 2018 Organized by <u>Sri Lakshmi Narayana Institute of Medical Sciences</u>,</p> <p>Pondicherry- 605 502, India.</p>		
<p>Dr. S.N. Rathod RESOURCE PERSON</p>		<p>Dr. Jayalakshmi COORDINATOR</p>