International Research Journal of Natural and Applied Sciences
ISSN: (2349-4077)
Impact Factor- 5.46, Volume 4, Issue 7, July 2017
Website- www.aarf.asia, **Email** : editor@aarf.asia , editoraarf@gmail.com

FRAMEWORK FOR IMPACT OF BODY MASS INDEX ON POST OPERATIVE COMPLICATIONS OF SPORTSPERSON

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ABSTRACT

People engage themselves in various sports activities for many reasons like health benefits, leisure activities, socialization etc. However, many people suffer due to sports activities and frequently require to utilize the health care system for treatment of immediate and late results of sports which includes injury among other results. Every year in USA, nearly two million people, receive treatment in emergency departments for sports related injuries, many of whom are otherwise healthy. Many of those require and undergo surgical intervention. It has been revealed by some studies that Body Mass Index (BMI) plays some role in post surgical outcome. The present article proposes a conceptual frame work for Impact of body mass index on post operative complications in sports related injury.

Keywords: Body Mass Index, Impact, Post operative Complications

People engage themselves in various sports activities for many reasons like health benefits, leisure activities, socialization etc. However, many people suffer due to sports activities and frequently require to utilize the health care system for treatment of immediate and late results of sports which includes injury among other results. Every year many people receive treatment in emergency departments for sports related injuries, many of whom are otherwise healthy. According to the U.S. Consumer Product Safety Commission's National

Electronic Injury Surveillance System (NEISS), more than 1.9 million individuals had a sports-related injury that was treated in emergency departments in 2012. By sport, there were nearly 570,000 basketball injuries were treated in emergency departments and over 8,000 resulted in hospitalization; followed by 557,000 bicycling injuries, 466,000 football injuries, 265,000 baseball and softball injuries, 231,000 soccer injuries were treated in emergency departments. Some of those require and undergo surgical intervention. It has been revealed by some studies that Body Mass Index (BMI) plays some role in post surgical outcome. The present article proposes a conceptual frame work for Impact of body mass index on post operative complications in sports related injury.

The most common injuries in basketball and soccer are sprained or fractured ankles and knees, followed by facial injuries and broken or dislocated fingers. The most common injuries in bicycle sports accidents are head injuries and shoulder fractures or dislocations. In soccer, injuries include broken or dislocated fingers, shoulders or knees but more serious is head injuries. In baseball and softball, the most frequent injuries are fractured or sprained ankles and knees and facial injuries.[1]

Even the players of golf, which is often perceived as a leisurely sports activity, can sustain injury, may it be from poor technique or from overuse. The lead shoulder is particularly vulnerable to injury, and the common shoulder problems include subacromial impingement, acromioclavicular arthrosis, rotator cuff tear, glenohumeral instability, and glenohumeral arthrosis. Some golfers fail to respond to nonsurgical management and require appropriate surgical intervention.[2]

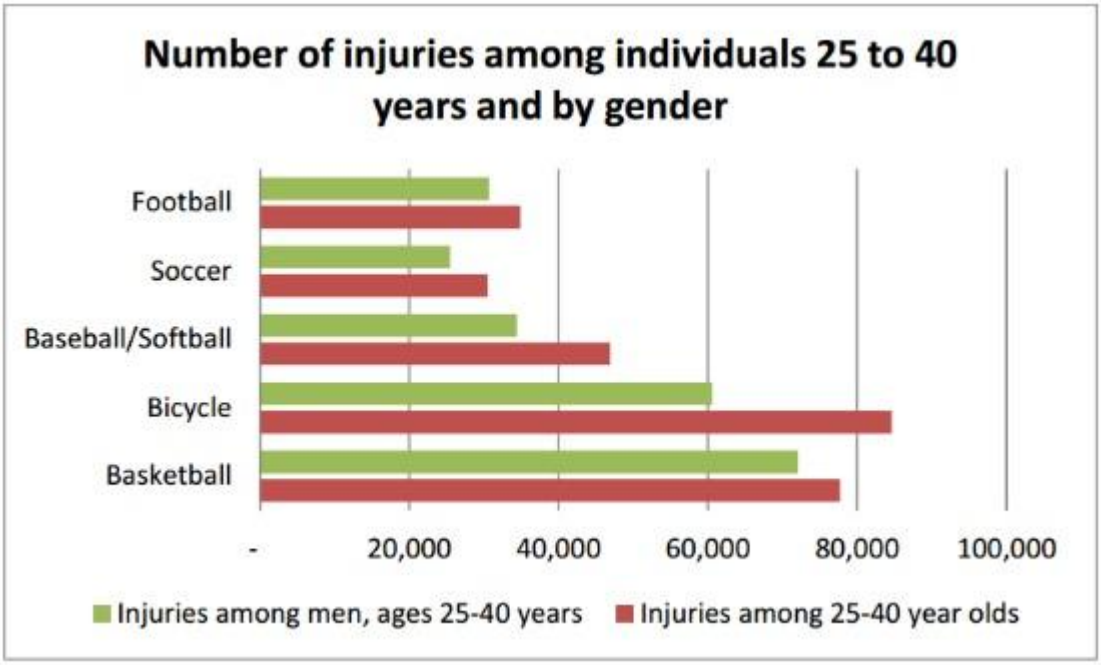

Figure 1: Number of injuries among individuals 25 to 40 years and by gender.

Source: ASPE computations from U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System for 2012

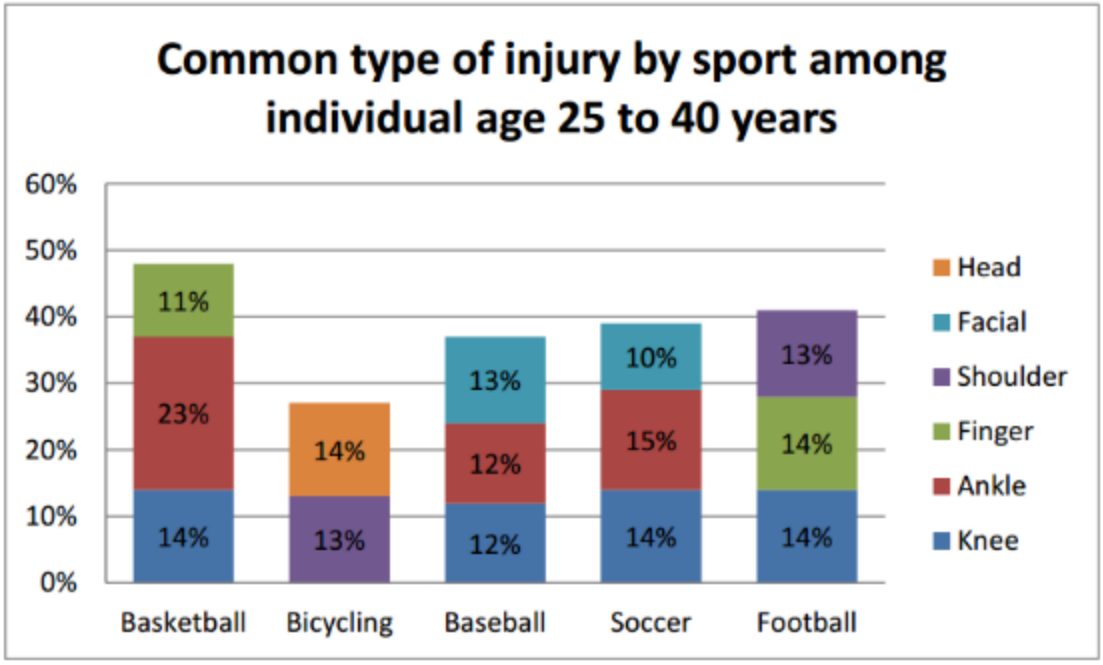

Figure 2: Common type of injury by sport among individual age 25 to 40 years.
Source: ASPE computations from U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System for 2012

Despite the considerable effectiveness of surgical interventions in conjunction with necessary adjuvant therapy, the surgical outcome varies greatly among patients with diverse baseline characteristics. Therefore, individual variations of patients are required for study to improve their well being. In recent years, the surgical outcomes of patients in different BMI subgroups has attracted attention of researchers, and several studies have reported that the body mass index (BMI) may exhibit an impact on postoperative complications and could be associated with the long-term well being of patients. Thus, the impact of BMI on surgical outcomes in sports persons should be subject of in depth study in the clinical settings.[3]

The body mass index (BMI) is an attempt to quantify the amount of tissue mass including muscle, fat, and bone in an individual, in value derived from the mass and height of an individual and is defined as the body mass divided by the square of the body height, and is universally expressed in units of kilogram/meter^2. The BMI categorizes a person as underweight, normal weight, overweight, or obese based on that value. However, the people of Asian descent have different associations between BMI, percentage of body fat, and health

risks than those of European descent, with a higher risk of type 2 diabetes mellitus and cardiovascular diseases at BMIs lower than the WHO cut-off point for overweight, 25 kg/m^2. Due to its simplicity, it has come to be widely used for preliminary diagnosis, and provides a simple numeric measure to allow health professionals study weight problems more objectively[4].

Classification	BMI(kg/m^2)	
	Principal cut-off points	Additional cut-off points
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
Mild thinness	17.00 - 18.49	17.00 - 18.49
Normal range	18.50 - 24.99	18.50 - 22.99
		23.00 - 24.99
Overweight	≥25.00	≥25.00
Pre-obese	25.00 - 29.99	25.00 - 27.49
		27.50 - 29.99
Obese	≥30.00	≥30.00
Obese class I	30.00 - 34.99	30.00 - 32.49
		32.50 - 34.99
Obese class II	35.00 - 39.99	35.00 - 37.49
		37.50 - 39.99
Obese class III	≥40.00	≥40.00

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

Figure 3:The International Classification of adult underweight, overweight and obesity according to BMI

Although the frequency of postoperative complications is perceived as a sign of the quality of surgery, the uncertainty of its reporting is of concern, and it is needed to compare the adverse events recorded after each specific approach in a simple, reproducible, flexible and applicable manner, irrespective of the cultural background. Standard scoring of the complications is necessary to allow comparison among different centers and within a center over time. Among available classification systems for reporting of complications, one should mention the Clavien-Dindo classification. Early adverse events within 30 days after the surgery may be considered as postoperative complications and can be classified into 5 grades on the basis of the Clavien-Dindo classification system with reference to the therapy. The classification was first described by Clavien *et al.* in 1992, to report a severity grading system called T92, with four grades containing five levels of complication. A modification of the system was provided by Dindo *et al.* in 2004, with five grades containing seven levels, which have been validated and accepted worldwide in many fields of surgery (Figure 4).

Grade	Classification Criteria
Grade I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions. Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside
Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included
Grade III	Requiring surgical, endoscopic, or radiological intervention
Grade IIIa	Intervention not under general anesthesia
Grade IIIb	Intervention during general anesthesia
Grade IV	Life-threatening complication (including CNS complications)* requiring IC/ICU management
Grade IVa	Single organ dysfunction (including dialysis)
Grade IVb	Multiorgan dysfunction
Grade V	Death of a patient

Suffix "d" (for "disability") is added to the respective grade of complication if the patient suffers from a complication at the time of discharge. This disability label indicates the need for a follow-up to fully evaluate the complication.

* Brain hemorrhage, ischemic stroke, subarachnoid bleeding, but excluding transient ischemic attacks.

CNS = central nervous system; IC = intermediate care; ICU = intensive care unit.

Figure 4: The Clavien-Dindo classification system of postoperative complications with reference to therapy

A conceptual framework is an analytic tool with several variations and contexts, used to make conceptual distinctions and organize ideas. Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply. The term conceptual framework can be used in various scales both large and small and in various contexts like social science, marketing, applied science, art etc. Its explicit definition and application can therefore vary. Conceptual frameworks are particularly useful as organizing devices in empirical research at the micro- or individual study level; the notion of conceptual framework can also be applied to deductive empirical research. The conceptual frameworks are abstract representations, connected to the research project's goals that direct the collection and analysis of data[6].

We propose a conceptual framework for understanding the impact of Body mass Index in postoperative complications in sports persons in sports related immediate and late surgical intervention as follows:

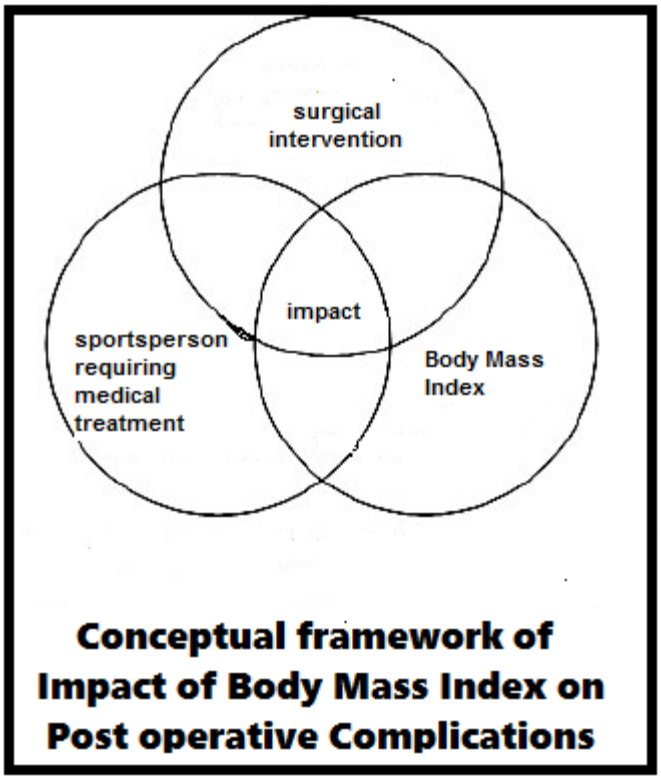

Figure 5: Conceptual framework No. 1 of impact of BMI on postoperative complications

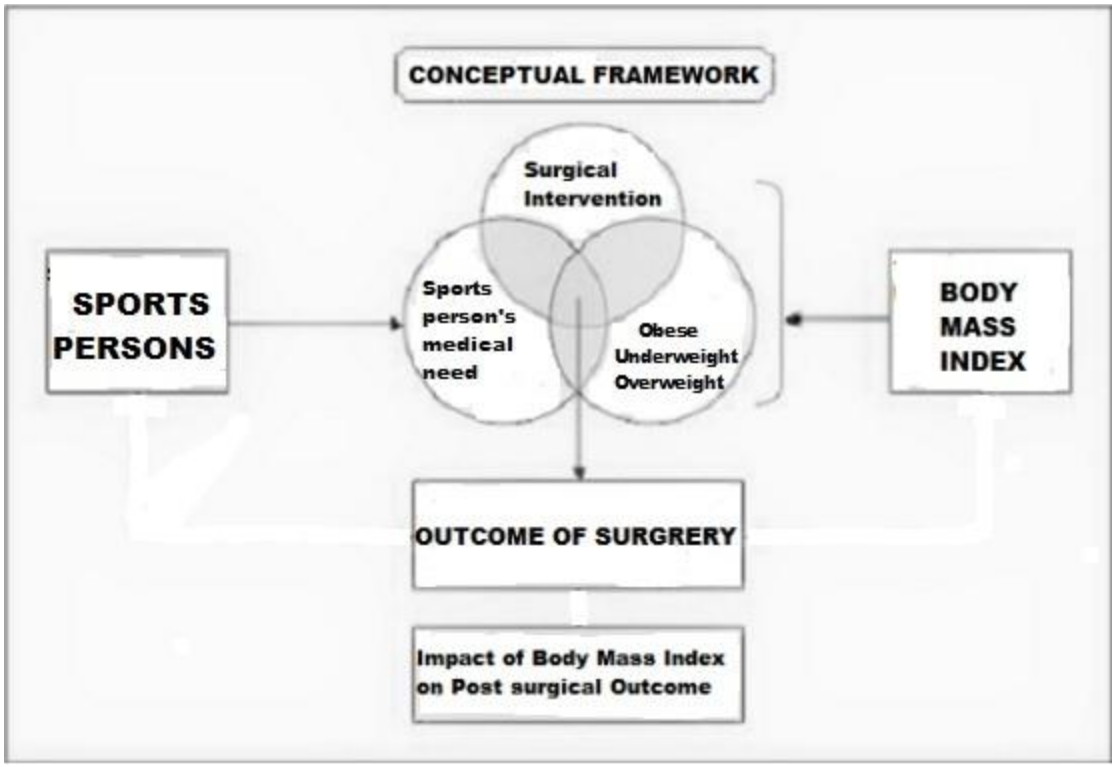

Figure 6: Proposed conceptual framework No2 of impact of BMI on postoperative complications

BMI is a significant predictor of mortality within 30 days of surgery, even after adjusting for the contribution to mortality risk made by type of surgery and for a specific patient's

overall expected risk of death. The data of major surgical procedures reported in the participant use data file database of the American College of Surgeons National Surgical Quality Improvement Program which included a total of 189533 cases of general and vascular surgical procedures reported in 2005 and 2006 from 183 sites for patients with known overall probabilities of death. Among these, 3245 patients died within 30 days of their surgery (1.7%). Patients with a BMI of less than 23.1 demonstrated a significant increased risk of death, with 40% higher odds compared with patients in the middle range for BMI (26.3 to <29.7). Important differences in the association between BMI and mortality risk occur by type of primary procedure.[8] Clinical studies have indicated the existence of an "obesity paradox" in patients with chronic heart failure (HF). The systematic review and meta-analysis of published research (6 for final analyses (n = 22,807)) In conclusion, found that the risk for total mortality and CV mortality and hospitalization was highest in patients with chronic HF who were underweight as defined by low BMI, whereas risk for CV mortality and hospitalization was lowest in overweight subjects.[9] In the general population, the lowest mortality risk is considered to be for the body mass index (BMI) range of 20-24.9 kg/m. In chronic diseases (chronic kidney disease, chronic heart failure or chronic obstructive pulmonary disease) the best survival is observed in overweight or obese patients. Recently above-mentioned phenomenon, called obesity paradox, has been described in patients with coronary artery disease. The obesity paradox in patients with acute coronary syndrome (ACS) has been confirmed in meta-analysis of 26 studies with 218,532 patients. Although it seems to be clear and quite obvious, outcomes should be interpreted with caution. It is remarkable that obese patients had more often diabetes mellitus and/or hypertension, but they were younger and had less bleeding complications, which could have influence on their survival.[10]

Conclusions:

Many a researches have been done to study on the relationship of BMI and post surgical outcome. Some of these studies are institution specific while a few are country specific, but mostly these are pre operative disease condition specific, such as gastric carcinoma etc. These researches generated controversy in the relationship between BMI and post surgical complications. It necessitates the research in some other groups, and we are interested in sportsperson specific field. For this, we propose the framework that may help to study the impact of BMI on post operative complications of sportspersons, though it may seem that suggestion of conceptual framework is abstract and contribution of this idea for further studies may seem limited.

References

1. Misra A. Common Sports Injuries: Incidence and Average Charges.2014.Issue Brief. Office of the Assistant Secretary for Planning and Evaluation. Department of Health and Human Services. http://aspe.hhs.gov accessed on Dec 2, 2016.
2. David H. Kim, Peter J. Millett, Jon J. P. Warner, Frank W. Jobe, Shoulder Injuries in Golf. Am J Sports Med. 2004; 32(5):1324-30.
3. Chen Hai-Ning, Chen Xin-Zu, Zhang Wei-Han, Yang Kun, Chen Xiao-Long, Zhang Bo, et al. The Impact of Body Mass Index on the Surgical Outcomes of Patients with Gastric Cancer: A 10-Year, Single-Institution Cohort Study. Medicine (Baltimore). 2015; 94(42):e1769.
4. WHO. Geneva: World Health Organization; 2006. Global database on Body Mass Index: BMI Classification. J Thorac Cardiovasc Surg. 1999; 118(5):866-73.
5. Slankamenac K, Graf R, Barkun J, Puhan M A. Clavien P. The Comprehensive Complication Index: A Novel Continuous Scale to Measure Surgical Morbidity. Annals of Surgery. 2013; 258 (1˘) 1–7.
6. Global Database on Body Mass Index - World Health Organization. Retrieved on Jul 12, 2016
7. https://en.wikipedia.org/wiki/Conceptual_framework accessed on Dec 7, 2016.
8. Turrentine FE1, Hanks JB, Schirmer BD, Stukenborg GJ. The relationship between body mass index and 30-day mortality risk, by principal surgical procedure. Arch Surg. 2012; 147(3):236-42.
9. Sharma A, Lavie CJ, Borer JS, Vallakati A, Goel S5, Lopez-Jimenez F, Arbab-Zadeh A, Mukherjee D, Lazar JM. Meta-analysis of the relation of body mass index to all-cause and cardiovascular mortality and hospitalization in patients with chronic heart failure. Am J Cardiol. 2015; 115(10):1428-34.
10. Niedziela J1, Hudzik B, Niedziela N, Gąsior M, Gierlotka M, Wasilewski J, Myrda K, Lekston A, Poloński L, Rozentryt P. The obesity paradox in acute coronary syndrome: a meta-analysis.Eur J Epidemiol. 2014; 29(11):801-12.