

INTER-RELATIONSHIP OF *MEDA DHATU DUSHTI* AND *ASTHI KSHAYA* IN CONTEXT TO OBESITY**Priyanka Kumari¹, Guteri Meena², Chhaju Ram Yadav³, Sarika Yadav⁴**

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Advanced technology leads to deprived health due to a stagnant lifestyle. Obesity is one such lifestyle disorder that is the precursor of several comorbid conditions. Health statistics link obesity with an increased risk of fracture which is an alarming issue and suggests the need to create awareness regarding the same. A high-fat diet, an inactive lifestyle, or a lack of physical activity impeded various metabolic pathways, changed the fate of cells from their normal destination, and affected bone homeostasis, according to the study. **Aims and Objectives-** Several recent studies have proposed that obesity is a risk factor for certain fractures indicating a strong contrary association between obesity and bone mineral density. The study is aimed to find the correlation between obesity and osteoporosis through a critical review. **Methods-** The material for this conceptual study is collected from various Ayurvedic texts, articles, online journals, etc. **Discussion & Conclusion-** When *Meda* Dhatu gets vitiated, then its *Snigdha* (unctuous) and *Picchil* (Viscid) qualities, obstructs the channel of circulation of tissue fluid, resulting in the deprivation of succeeding dhatu, i.e. *Asthi Dhatu*. Excessive calorie intake and less calorie expenditure led to excessive accumulation of fat in the adipocyte causing its hypertrophy. Depending on the site i.e., abdominal or gluteofemoral hypertrophy of adipocyte, the severity of obesity-related complications observed.

Keywords: Meda dhatu, Asthi dhatu, Meda roga, Obesity, Osteoporosis

INTRODUCTION

The antecedent to many comorbid conditions is obesity. Recent research that suggests obesity may increase the risk of some fractures also found a strong negative correlation between obesity and bone mineral density. According to the *Saptadhatvatmak Purush Siddhanta* (Principle of Seven Body Constituents), the bodily constituents *Meda* (Fatty Tissue) and *Asthi* (Bone Tissue) Health statistics show a correlation between obesity and a higher risk of fracture, which has significant public health implications and highlights the need for developing efficient methods to lower the risk of fracture in obese individuals. By a critical analysis of classical literature, modern literature, and published research work in PubMed and Google scholar index journals, the study seeks to determine the relationship between obesity and osteoporosis.

Asthi Dhatu is the function of preserving the bodily structure among these *Dhatus*. *Asthi* is derived from *Meda Dhatu*, according to *Acharya Charak* in *Chikitsa Sthana*. The main duties of *Meda Dhatu* are to nourish *Asthi* (bones) and to fortify the body. Due to the consumption of causative components including *Madhura rasa Ahara*, *Avyayam*, and *Diwaswapa*, among others, the pathogenesis of *Sthoulya* involves a number of occurrences. The key pathogenic processes in *sthoulya* include *medo dhatu vridhhi*, *Sroto avarodha by meda*, *jatharagni vridhhi*, and vitiation of dosha, primarily *kapha*. The production of *Asthi* (bone tissue) is directly impacted by vitiated *meda*. Osteoporosis is a condition that lowers bone density, leaving bones more vulnerable to spontaneous fractures when subjected to mechanical stresses from normal activities.

MATERIALS AND METHODS

The study was carried out through a careful examination of ancient literature, contemporary literature, and published research work in PubMed and Google Scholar index journals. The most likely relationship between the acquired information has been established and is being presented carefully.

Osteoporosis:

A reduction in bone mass that increases the risk of fracture is referred to as osteoporosis. Using dual-energy X-ray absorptiometry, the World Health Organization (WHO) defines osteoporosis as a bone mineral density that is 2.5 standard deviations or more below the mean peak bone mass (average of young, healthy persons). The two types of osteoporosis are primary and secondary. Primary osteoporosis in women is brought on by ageing and oestrogen insufficiency after menopause. On the other hand, secondary osteoporosis can develop at any age as a result of chronic predisposing factors such as medical disorders, long-term medication, and other similar things. When this occurs, bodily cells use the autophagy mechanism to recycle nutrients and energy in an effort to maintain homeostasis.

Obesity and bone metabolism:

"Obesity and overweight are defined as abnormal or excessive fat build-up that poses a health concern," according to the World Health Organization. Overweight and obesity are identified as abnormal or excessive fat accumulation that can lead to impaired health. Obesity is a systemic disease of the white adipose tissue (WAT). The researcher explored that both visceral adipose tissue (VAT) and subcutaneous adipose tissues (SAT) possess osteogenic potential. The osteogenic differentiation capacity of visceral adipose tissue (VAT) is more as compared to subcutaneous adipose tissues (SAT). The osteogenic differentiation of visceral adipose tissue (VAT) and subcutaneous adipose tissues (SAT) depends on the tissue vasculature, better blood supply induces a higher population of osteoprogenitor cells. Increased fat storage in adipose tissue eventually results in an imbalance of several enzymes, including leptin, adiponectin, and others, which hinder the various metabolic pathways essential for maintaining health. One such metabolic route is impacted by fat.

DISCUSSION

Excessive calorie intake and less calorie expenditure led to excessive accumulation of fat in the adipocyte causing its hypertrophy. Depending on the site i.e., abdominal or gluteofemoral hypertrophy of adipocyte, the severity of obesity-related complications observed. Dhatus are the primary elements of the body, according to *Ayurveda*. *Dhatu* is in charge of the body's upkeep and development. *Kedarkulya Nyaya*, *Khalekapot Nyaya*, and *Ksheerdadhi Nyaya* were the three modes of conveyance used to transport food from previous digested by *Jatharagni*, who then converts it into *rasa Dhatu*. If any impediment, tumor, or other deformity occurs in the passage of these *Strotasa*, the *Uttarottar Dhatu* will *Kshaya*(declining). Every *Dhatu* has its digestive power called *Dhatvagni*. If the respective *Dhatvagni* gets deranged it causes *Vridhhi* of that particular *Dhatu*. *Medo-dhatvagnimandya* causes *Meda Dhatu vridhhi* called *Medoroga*. As *Meda* lies in the middle of the sequence of *Sapta Dhatu*, *Medovridhhi* disturbs the homeostasis of the body. And that's why *Medoroga* or obesity is a metabolic syndrome as the various metabolic pathways get affected due to hypertrophied adipocytes. Adipocyte hypertrophy has two negative effects. First is adipose tissue blood flow reduction (ATBP reduction) which lessens the osteogenic differentiation, and second Vitamin D remains stagnant in the adipocytes, lowering the serum vitamin D level.⁴³This reduces calcium absorption from the intestine, lowering serum calcium, which is one of the triggering factors for bone resorption. Adipocyte is the storehouse of energy in the form of lipids. Whenever our body needs excess energy this lipid release energy for the functioning of different tissues. Adipocyte is metabolized to acetyl-CoA by utilizing glucose which is used for *de novo* fatty acid synthesis. This free fatty acid is the lipid source for osteoblast. Means *Asthi* means bones made up of osteocytes i.e., bone tissues are formed from osteoblasts. This osteoblast required energy from fatty tissue i.e., adipocyte (*Meda Dhatu*) to get transformed into osteocyte i.e., *Asthi Dhatu*. And this process is governed by the metabolic pathway. A high-fat diet or inactive lifestyle, altered the bone marrow microenvironment and mesenchymal stem cell

differentiation, aids the production of adipocytes over osteoblasts (bone-forming cells), and makes bone fragile. *Asthi kshay* (osteoporosis) can be treated with *shamana Chikitsa* as per *Ayurveda*. Here we have to consider *Vata dosha* and *Asthi dhatvagni*. As there is an interrelationship between *Vata dosha* and *Asthi dhatu* (an increase in *Vata dosha* causes *Asthi kshaya* and vice versa), we have to use drugs having exactly opposite properties to *Vata dosha*. Properties that are responsible for the *shamana* of *Vata dosha* are *Snigdha*, *guru*, *shlakshna*, *sthira*, etc. Drugs that have these properties are *tail* (oil), *Ghruta*, *Dashamula*, *Bala*, etc. Also, we have to correct *Asthi Dhatvagni* by use of *tikta rasatmaka dravyas* which possess *dipan* and *pachana* properties. In this, *panchtiktak ghruta* is important. As the functioning of *Asthi dhatvagni* is corrected, it leads to the normal formation, functioning, and proportion of *Asthi dhatu* in the body. Using this principle, *Asthi dhatu kshay* (Osteoporosis) is treated by correcting *Meda* and *Asthi dhatvagni*.

CONCLUSION

According to the study a high-fat diet, an inactive lifestyle, or a lack of physical activity impeded various metabolic pathways, changed the fate of cells from their normal destination, and affected bone homeostasis. Obesity is on the rise as a result of lifestyle changes, which can lead to a variety of diseases such as osteoporosis and make human life suffer from the lowest living conditions. Understanding the fundamental phenomenon behind the link between obesity and osteoporosis will help us develop an effective strategy for reducing the incidence of fractures in obese people.

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