absolute REEs. It has long been understood that body fat is less of a contributor to REE than fat-free mass, which makes up the body's metabolically active tissues. Obesity increases both body fat and fat-free mass, increasing REE in comparison to lean persons. The enhanced REE associated with obesity is generally in accordance with what is anticipated for the body weight and composition because REE is linearly related to both fat-free mass and body fat across a wide range of weights (Kevin & Juen, 2017).

Although fat-free mass and fat mass are effective predictors of REE, they only account for about 70% of inter-individual REE variability. As a result, the REE residual standard deviation for a given body composition is approximately 300 kcal/d. After taking into account body fat and fat-free mass, there may still be some residual REE variability that is brought on by differences in the organ masses because the organs that contribute to the fat-free mass have a wide range of metabolic rates. Organ sizes have been measured using magnetic resonance imaging techniques, and REE prediction models that add the individual metabolic rates of different organs account for around 80% of the REE variability (Kevin & Juen, 2017).

2.1.3 Physical Activity Expenditure

Voluntary activity and daily activities, often known as spontaneous physical activity or non-exercise activity thermogenesis, make up the two main categories of physical activity expenditure. The length and intensity of physical activity, in relation to total body weight, affect the amount of energy expended (Kevin & Juen, 2017). As a result, even though they are normally less active, those who are obese often have similar daily energy expenses for exercise as those who are not, and physical activity energy expenditure decreases with weight loss unless its quantity or intensity improves to make up for it (Levine, 2017)