

身體質量指數和年紀對精液品質的影響 Impact of Body Mass Index (BMI) and Age on Semen Quality

蔡永杰, 溫仁育, 林毅倫, 蕭存雯, 陳怡婷
Yung-Chieh Tsai, Jen-Yu Wen, Yi-Lun, Lin, Tsun-Wen Hsiao, Yi-Ting Chen

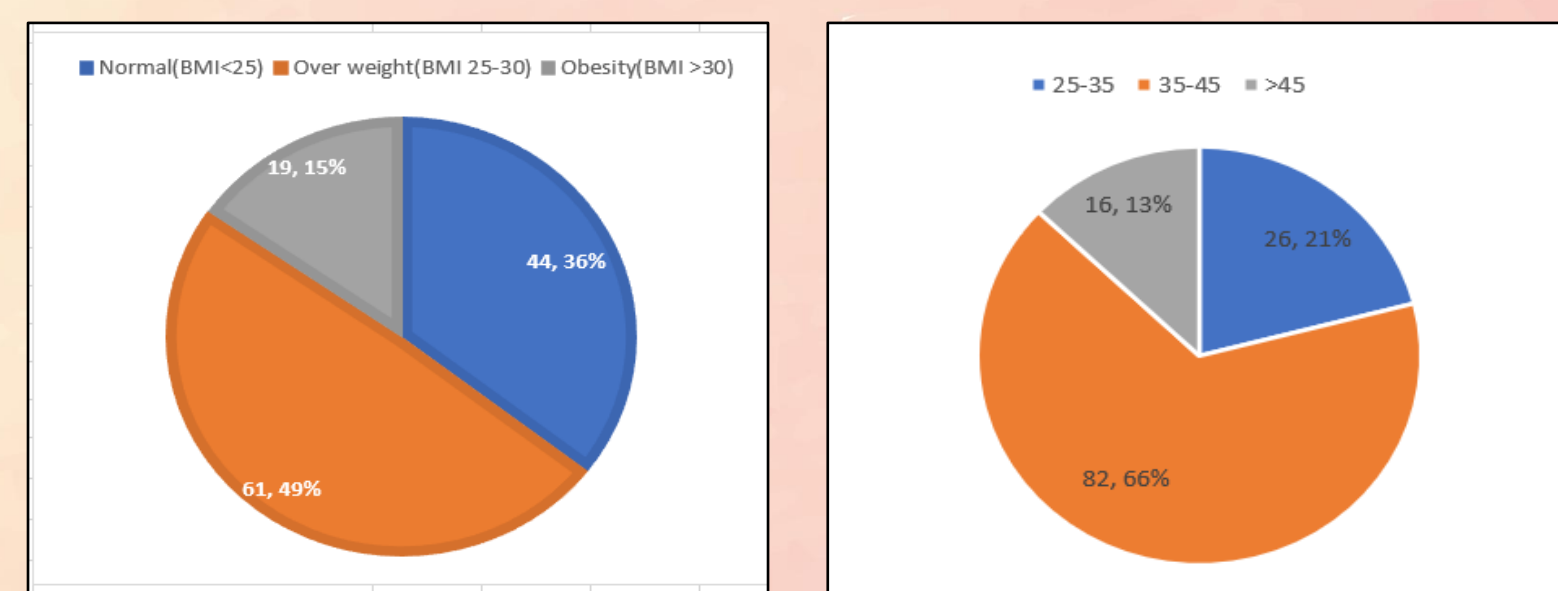
奇美醫療財團法人奇美醫學中心、婦產部、生殖醫學中心
Center for Reproductive Medicine, Department of Obstetrics and Gynecology, Chi Mei Medical Center, Tainan, Taiwan

Purpose

This study aimed to investigate the impact of age and body weight on semen parameters, including semen ejaculate volume, total sperm count, and sperm motility.

Materials and Methods

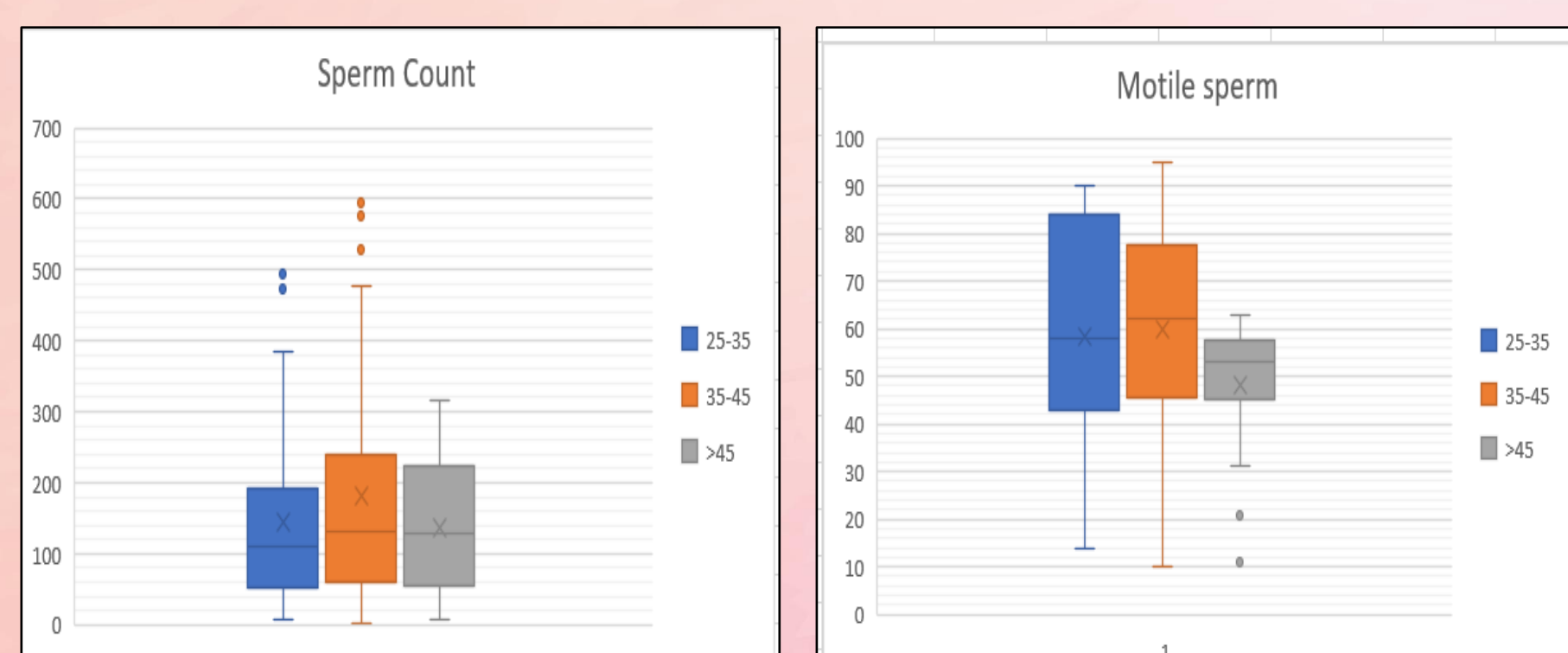
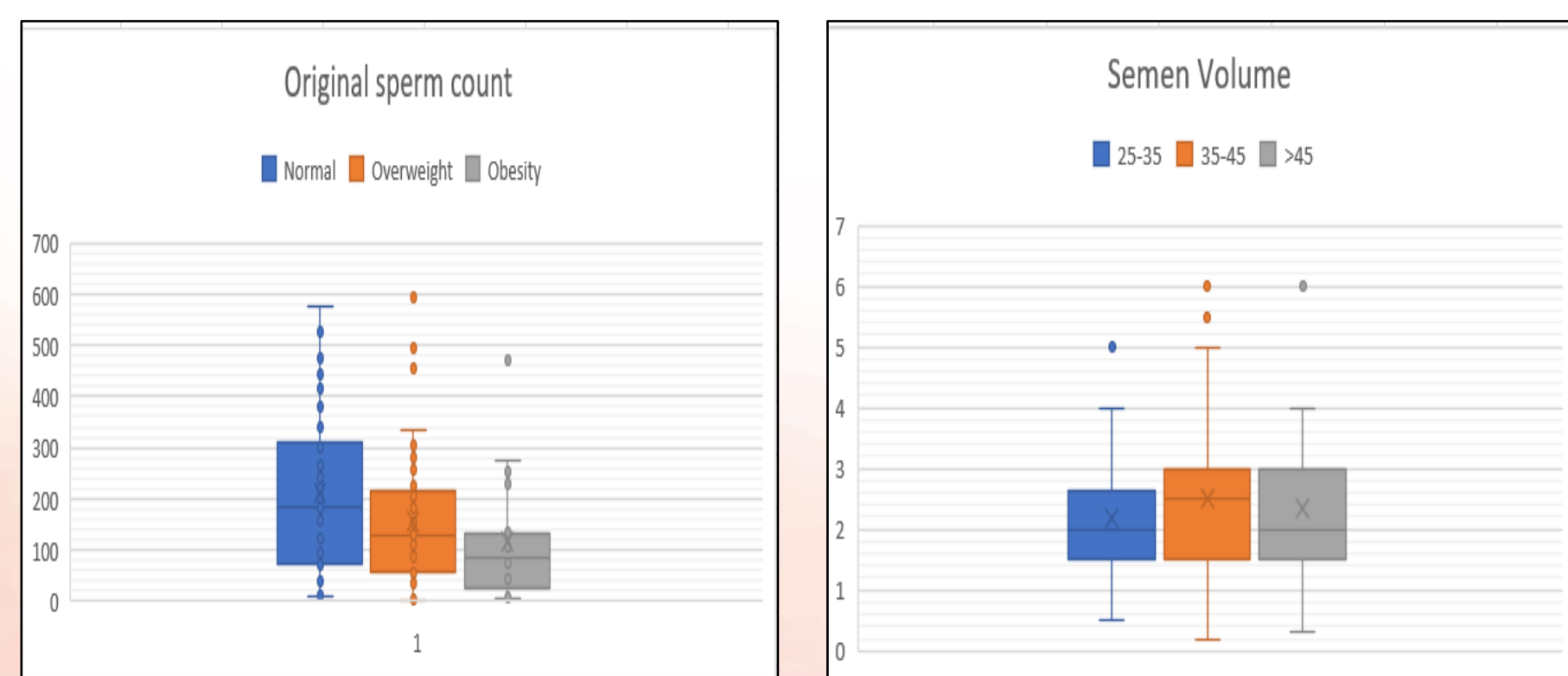
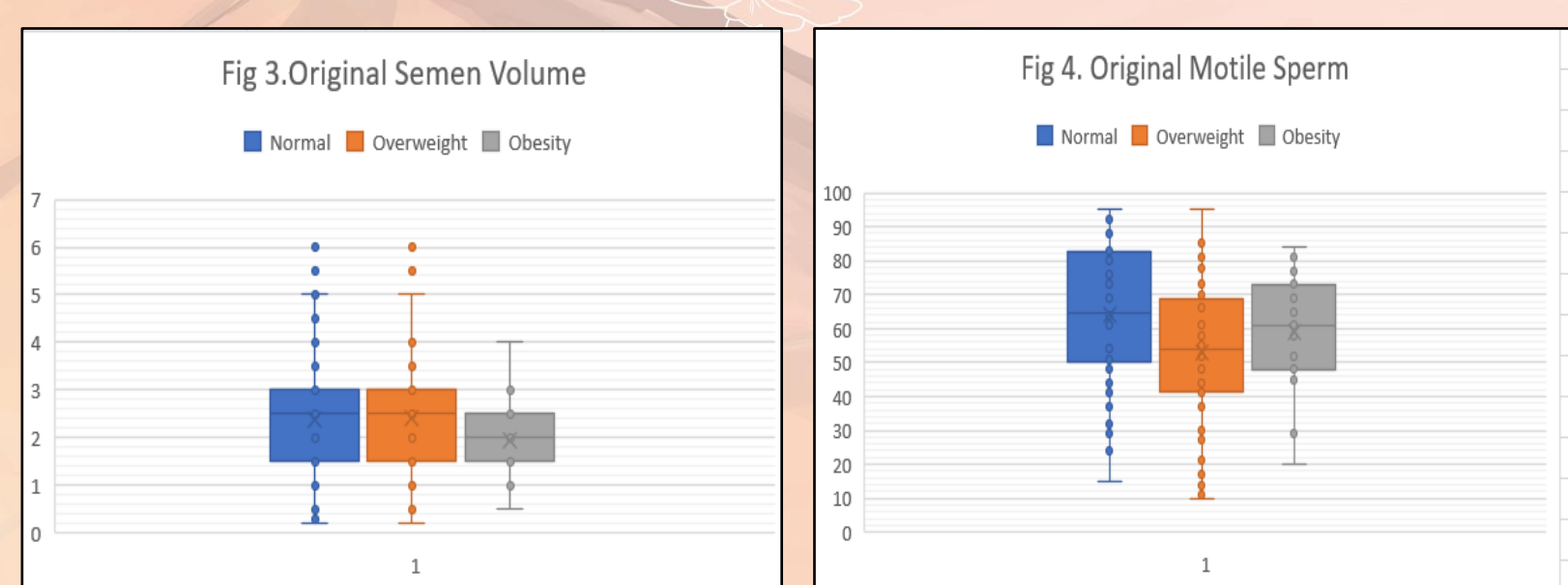
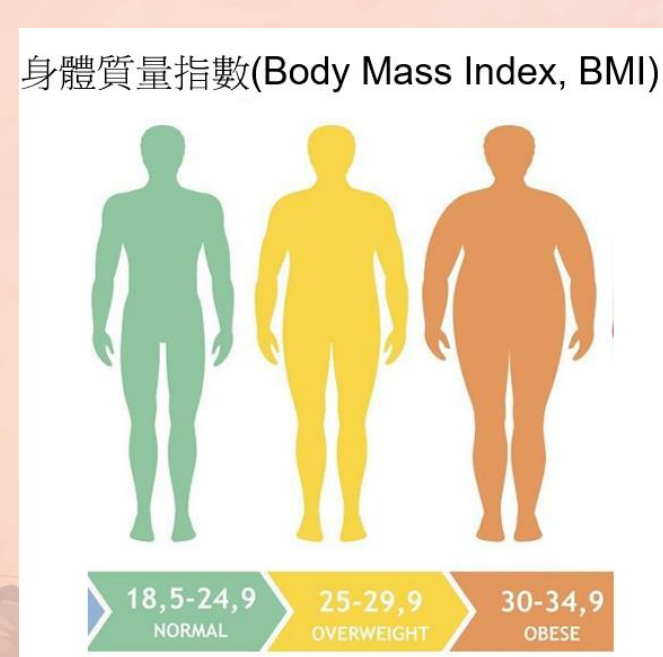
From March 2023 to October 2023, semen samples from male patients visiting our hospital were analyzed and categorized based on their Body Mass Index (BMI) and age. A BMI less than 25 was classified as normal, a BMI between 25 and 30 was considered overweight, and a BMI greater than 30 was categorized as obesity. A total of 124 patients were included in this study. During the initial screening, 36% (44/124) of the patients demonstrated a normal BMI, 49% (61/124) were identified as overweight, and 15% (19/124) fell into the obese category (Fig. 1).



Upon stratifying patients by age, 21% (26/124) were below 35 years old, 66% (82/124) fell within the 35-45 age range, and 13% (19/124) were older than 45 years (Fig. 2).

Results

There was no statistically significant difference in semen volume among individuals with normal body weight, overweight, and obese groups (2.38 ± 1.23 , 2.40 ± 1.22 , and 1.94 ± 0.88) (Fig. 3). However, a significant difference was observed in the percentage of motile sperm between individuals with a normal BMI and overweight male patients (64.13 ± 20.23 vs. 52.95 ± 21.01 ; $P=0.007$) (Fig. 4). Although there was a trend suggesting that overweight and obese males might have a lower total sperm count, the difference was not statistically significant (Fig. 5).



To our surprise, young male patients in our study appeared to have less semen volume and a lower total sperm count than aged males, although the differences were not statistically significant (Fig 6,7). Older males seemed to exhibit fewer motile sperm than younger male patients (59.7 ± 20.76 vs. 48.12 ± 15.27 ; $P=0.03$) (Fig 8).

Conclusion

A significant majority of Taiwanese males are currently either overweight or obese (64%). Obesity can lead to a decline in sperm quality in men due to several factors, resulting in infertility. For example, obesity may alter the coordination of the reproductive endocrine system, especially the hypothalamus-pituitary-gonad (HPG) axis and its interactions with other reproductive hormones.

Male obesity can lead to a decrease in male hormones and an increase in female hormones, causing an imbalance in FSH/LH and affecting spermatogenesis in the testes. Obesity can cause significant fat deposition in the lower abdomen and inner thighs, leading to an increase in scrotal temperature, thereby reducing sperm motility. Obesity also triggers a systemic inflammatory response, increasing reactive oxygen species (ROS) in the body, resulting in oxidative stress (OS), raising the proportion of damaged sperm DNA, and reducing both the quantity and motility of sperm. Therefore, prioritizing lifestyle modifications and weight management is crucial as the initial approach for overweight men contemplating pregnancy.

It's important to note that age significantly influences fertility in both men and women. In men, advanced age is associated with the production of lower-quality sperm with suboptimal motility. Our findings that older males exhibited fewer motile sperm than younger male patients provide valuable insights for men. Whether the accidental finding that the younger male exhibited fewer semen volume and total sperm in our study were due to their more frequency of sexual intercourse need further investigation.