

Effect of Body Mass Index and Physical Fitness on Injury Risk for Soldiers during Army Basic Combat Training

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Research show that higher BMI is associated with decreased fitness and increased risk of injury.

PURPOSE: Describe effects of Body Mass Index (BMI) and physical fitness on injury risk for recruits in Basic Combat Training. **METHODS:** Soldier demographics and Army Physical Fitness Test (APFT) performance (2-min push-ups [PU] and sit-ups [SU] and timed 2-mile run [Run]) were acquired years 2010-2012. Injury data were also acquired. Quintiles (Q) were established for body mass index (BMI: weight/height²) PU, SU, and Run. Injury risk (% of Soldiers injured) and relative risk (RR) with 95% confidence intervals (CI) were calculated for all cells in 5x5 tables with quintiles of BMI in rows (Q1 [lowest] – Q5 [highest]) and quintiles of PU, SU, and Run in columns from lowest to highest. For the RR table for BMI x Run, the referent cell was BMI Q3 (middle) and Run Q1 (fastest). For the other APFT events, the referent cell was BMI Q3 (middle) and PU/SU Q5 (highest number). **RESULTS:** Of the 41,727 women studied 40.3% were injured. Means \pm standard deviation for BMI, PU, SU, and Run, respectively were, 23.3 ± 2.7 , 31 ± 12 , 60 ± 12 and 17.7 ± 1.8 minutes. In the 5x5 table with injury RRs for quintiles of BMI (Q1- Q5) by Run (Q1 - Q5), the highest risks were women with the lowest BMI and the slowest run time (BMI Q1/Run Q5) compared to the referent BMI Q3/Run Q1 (RR=2.6[CI = 2.3-2.8]). Women with the highest BMIs, who ran fastest (BMI Q5/Run Q1) exhibited among the lowest RRs (RR women = 1.01[CI = 0.9-1.2]). At every level of aerobic fitness (run-time) from Q1 to Q5 women with the highest BMIs (Q5) were at 14% to 22% lower risk than the leanest (Q1). The RR for BMI stratified by PU with lowest BMI (Q1) and lowest number of PU Q1 compared to the referent RR=1.7[CI=1.5-1.9], while the highest BMI with lowest number of PU (BMI Q5/PU Q1) compared to referent (RR=1.7[CI= 1.5-1.8]). **CONCLUSION:** The most important finding was that across all levels of aerobic fitness women with the highest BMIs were less likely to be injured.