**Table Legends:**

Table 2: Risk factors for Injuries in Female Military Personnel

Table 2 Abbreviations: RR = Relative Risk, OR = Odds Ratio, IRR = Incident Rate Ratio, HR = Hazard Ratio, 95% CI = 95% Confidence Interval, n/s = not significant, in = inches

Table 2:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Author, Year Study Type** | **Population** | **Risk Factor** | **Key Findings** | | | **Methodological Quality Score** |
| 1. Altarac, 2000 (22)   Cohort Study | 915 female US Army recruits in 8-week basic training | Smoking in 1 month prior to enlisting | Smoking vs not smoking.  **Any injury**  Traumatic  Overuse  **≥ 1 days lost injury.**  **≥ 6 days lost** | | **aOR 1.61 [95% CI = 1.19-2.17]**  aOR 1.05 [95% CI = 0.67-1.64]  aOR = 1.71 [95% CI = 1.26-2.31]  **aOR = 1.44 [95% CI = 1.02-2.02]**  **aOR = 1.75 [95% CI = 1.21-2.51]** | 92% |
| 1. Anderson, 2017 (34) Cross-Sectional Study | 363 female enlisted US Army soldiers | Age  BF %  APFT push-ups  Sit-ups  2-mile run time | 22-26yrs (57% injured)  27-30yrs (43% injured)  ≥31yrs (48% injured)  ≤ 19.28%  19.29-23.37%  ≥ 23.38%  ≥72 reps  58-71 reps  ≤57 reps  ≥74 reps  63-73reps  **≤ 62 reps**  ≤14.13mins  14.14-15.67mins  ≥15.68mins | | REFERENCE  RR = 0.74 [95% CI = 0.30-1.80]  RR = 0.88 [95% CI = 0.53-1.47]  REFERENCE  RR = 1.05 [95% CI = 0.32-3.48]  RR = 1.30 [95% CI = 0.44-3.82]  REFERENCE  RR = 1.09 [95% CI = 0.78-1.54]  **RR 1.35 [95% CI = 1.01-1.80] p=0.03**  REFERENCE  RR = 0.92 [95% CI = 0.35-2.41]  RR = 1.32 [95% CI = 0.61-2.85] | 60% |
| 1. Bedno, 2018 (3)   Cohort Study | 37,413 female US Army soldiers (lower extremity ICD=9 musculoskeletal injuries) | Age  BMI  APFT  Current smoking (Y/N)  Deployment | **17-23yrs**  **24-28yrs**  **29-35yrs**  **≥ 36yrs**  Normal  Underweight  Overweight  Obese  >270  **240-269**  **215-239**  **<215**  **(Y)**  none  **1**  2 | | **REF**  **OR = 1.05 [1.01-1.10] p=0.008**  **OR = 1.18 [1.11-1.26] p<0.001**  **OR = 1.47 [1.27-1.69] p<0.001**  REFERENCE  OR = 1.16 [0.99-1.36] p=0.07  OR = 1.04 [1.00-1.08] p=0.09  OR = 1.03 [0.90-1.18] p=0.68  REFERENCE  **OR = 1.11 [95% CI = 1.03-1.20] p=0.006**  **OR = 1.17 [95% CI = 1.09-1.27] p<0.001**  **OR = 1.45 [95% CI = 1.35-1.57] p<0.001**  **OR = 1.30 [1.23-1.36]**  REFERENCE  **OR = 0.65 [95% CI = 0.58-0.72] p<0.001**  OR 0.73 [95% CI = 0.43-1.25] p=0.258 | 83% |
| 1. Bijur, 1997 (9)   Cohort Study | 85 female West Point Cadets | Height  Mean Run time per mile | N/S  7.2 min 42.1 injuries /100 cadets  8.1 mins 66.7injuries /100 cadets  8.7 mins 76.2 injuries /100 cadets  9.8 mins 126.3 injuries / 100 cadets | | | 92% |
| 1. Grier, 2010 (23) | 3856 women prior to AIT after recently finishing BCT | Age  Smoking  Number of Cigarettes | 17-19yrs  **20-24yrs**  25-29yrs  **≥30yrs**  Non-smokers  Occasional  Frequent  None  ≤ 10  10-20  > 20 | | REFERENCE  **OR = 1.29 [95% CI = 1.07-1.56]**  OR = 1.29 [95% CI = 0.96-1.74]  **OR = 2.02 [95% CI = 1.43-2.87]**  REFERENCE  OR = 1.01 [95% CI = 0.74-1.39] p=0.95  OR = 0.96 [95% CI =0.80-1.15] p=0.65  REFERENCE  OR = 1.04 [95% CI = 0.80-1.34] p=0.77  OR = 0.91 [95% CI = 0.71-1.18] p=0.48  OR = 0.89 [95% CI = 0.61-1.30] p=0.55 | 70% |
| 1. Grier, 2011 (24) Cross-Sectional Study | 498 Women at US Army Ordinance School | Age  Smoking  Number of Cigarettes  Injury (Y/N)  Push-ups  Sit-ups  2 Mile Run | 17-19yrs  20-24yrs  25+yrs  Non-smokers  Occasional  Frequent  None  ≤ 10  10-20  **> 20**  **0-23 reps**  **24-30 reps**  31-36 reps  37+ reps  0-53 reps  54-60 reps  61-67 reps  68+ reps  0-17.00 mins  **17.01-18.08 mins**  18.09-19.38 mins  **19.39+ mins** | | REFERENCE  HR = 0.89 [95% CI = 0.68-1.16) p=0.39  HR = 1.18 [95% CI = 0.86-1.63] p=0.32  REFERENCE  HR = 1.08 [95% CI = 0.67-1.73] p=0.77  HR = 1.27 [95% CI = 0.98-1.63] p=0.07  REFERENCE  HR = 1.03 [95% CI = 0.71-1.49] p=0.89  HR = 1.37 [95% CI = 0.95-1.97] p=0.09  **HR = 1.71 [95% CI = 1.12-2.59] p=0.01**  **HR = 1.67 [95% CI = 1.21-2.30] p<0.01**  **HR = 1.47 [95% CI = 1.03-2.09] p=0.03**  **HR = 1.44 [95% CI = 1.02-2.04] p=0.04**  HR = 1.04 [95% CI = 0.71-1.53] p = 0.84  REFERENCE  HR = 1.28 [95% CI = 0.91-1.76] p=0.16  HR = 1.17 [95% CI = 0.83-1.66] p=0.36  HR = 1.04 [95% CI = 0.73-1.48] p=0.82  REFERENCE  REFERENCE  **HR = 1.46 [95% CI = 1.02-2.08] p=0.04**  HR = 1.27 [95% CI = 0.88-1.83] p =0.21  **HR = 2.04 [95% CI = 1.45-2.88] p<0.01** | 83% |
| 1. Heller, 2019 (25) Cohort Study | 227 British Army basic training recruits | 1.5 mile run time | Mean injury free time = 12min13sec  Mean Injured time = 12min43sec  Every 10 sec increase in time = 8.3% greater injury risk. | | | 75% |
| 1. Henderson, 2000 (35) Cross-Sectional Study | 287 Combat Medic Trainees | Age  Previous Injury  BMI  Body Mass  Smoking (Y/N)  Activity Prior to BCT  Frequency of Activity prior to BCT | <20yrs Injury Incidence 31.2%  20-25yrs Injury Incidence 21.3%  **>25yrs Injury Incidence 52.9%**  Y Injury incidence 29.5%  N Injury Incidence 37.4%  17.5-21.0 kg/m2 Injury Incidence 22.1%  22.0-23.5 kg/m2 Injury Incidence 29.0%  23.6-25.3 kg/m2 Injury Incidence 27.9%  25.4-31.2 kg/m2 Injury Incidence 36.8%  n/s p=0.305  46-57kg Injury Incidence 22.4 %  58-63kg Injury Incidence 30.9%  64-68kg Injury Incidence 22.2%  **69-95kg Injury Incidence 41.8%**  Yes - Injury Incidence 23.6%  No - Injury Incidence 31.8% (n/s p=0.190)  More than most – Injury Incidence 41.9%  Somewhat more than most - Injury Incidence 25.6%  As active as most – Injury Incidence 29.5%  Less active than most – Injury Incidence 25.0% (p=0.243)  0/week – Injury Incidence 36.4%  1-2/week– Injury Incidence 25.3%  3-4/week– Injury Incidence 31.0%  5-7/week– Injury Incidence 30.9% (p=0.623) | | REFERENCE  aOR = 0.7 [95% CI = 0.4-1.3]  **aOR = 3.5 [95% CI = 1.5-8.1]**  REFERENCE  aOR = 1.5 [95% CI = 0.7-2.3]  aOR =1.1 [95% CI = 0.5-2.5]  **aOR = 2.4 [95% CI = 1.1-5.0]** | 75% |
| 1. Jones, 1993 (26)   Cohort Study | 186 women Army trainees | Height  Body Fat %  Body mass  BMI  Push-ups  Sit-ups  Self-reported previous activity  Run Time  **Slow vs Fast Runners** | **Shorter 25% women at greater risk than taller 75%**  N/S  N/S  N/S  N/S  N/S  N/S  Q1  Q2  Q3  Q4  **Any injury**  **Lower body injury**  **Time loss injury**  **Stress Fracture** | **RR 1.7 [95% CI = 1.2-2.4] p=0.02.**  RR = 1.16 [95% CI = 0.5-2.7]  RR = 1.0  **RR = 2.40 [95% CI = 1.2-4.8] p=0.028**  RR = 2.18 [95% CI = 1.1-5.0] p=0.063  **RR = 1.69 [95% CI = 1.2-2.4] p=0.004**  **RR = 1.78 [95% CI =1.2-2.6] p=0.004**  **RR = 2.12 [95% CI = 1.2-3.7] p = 0.0007**  **RR = 2.54 [95% CI =1.0-6.6] p=0.05** | | 83% |
| 1. Jones 2017 (27)   Cohort Study | 41 727 women in Army Basic Training | 2-mile Run time  BMI  Slow run time and low BMI  Push-ups  Low BMI & Low Push-ups | Q1 (Fastest) injury risk =26.5%  **Q2 Injury risk = 35%**  **Q3 Injury risk = 39.3%**  **Q4 Injury risk = 44.6%**  **Q5 (Slowest) Injury risk = 56.0%**  **Q1 (Lowest) Injury risk = 41.9%**  Q2 Injury risk = 39.1%  Q3 Injury risk = 39.5%  Q4 Injury risk = 39.6%  **Q5 (Highest) Injury risk = 41.2%**  **Injury risk 63.1%**  **Low vs High 48.8% to 31.6%**  **Injury risk 50%** | | REFERENCE  **RR = 1.3 [95% CI = 1.3-1.4]**  **RR = 1.5 [95% CI = 1.4-1.5]**  **RR = 1.7 [95% CI = 1.6-1.8]**  **RR = 2.1 [95% CI = 2.0-2.2]**  **RR = 1.1 [95% CI = 1.02-1.1]**  RR = 1.0 [95% CI = 0.9-1.0]  REFERENCE  RR = 1.0 [95% CI = 0.9-1.1]  **RR = 1.04 [95% CI = 1.01-1.08]**  **RR = 2.6 [95% CI = 2.3-2.8], p<0.00001**  **RR = 1.5 [95% CI = 1.49-1.61] p<0.00001**  **RR 1.7 [95% CI = 1.6-1.9]** | 83% |
| 1. Knapik, 2001 (36)   Cohort Study | 474 women in Army Basic Training | Age  Height  Mass  BMI  **3.2km Run time**  **Push-ups**  Sit-ups  **Smoking**  **VO2max** | 17-20yrs  20-25 yrs  25-35yrs  58-62in  63-64in  65-66in  67-74in  90-119lbs  120-134lbs  135-150lbs  151-239lbs  15.81-20.54m/kg2  20.55-22.98m/kg2  22.99-25.01m/kg2  25.02-33.21m/kg2  13.00-19.48mins  19.49-21.65mins  **21.66-23.48mins**  **23.49-28.68mins**  **0-2 reps**  **3-5 reps**  **6-13 reps**  14-50 reps  0-22 reps  23-33 reps  34-44 reps  45-80 reps  **Y/N**  **> 20 Cigarettes/day**  **29.9-37.0ml/kg/min** | | REFERENCE  RR = 1.0 [95% CI = 0.8-1.3]  RR = 1.3 [95% CI = 0.9-1.9]  REFERENCE  RR = 1.0 [95% CI = 0.7-1.4] p=0.89  RR = 1.3 [95% CI = 0.9-1.9] p=0.22  RR = 1.0 [95% CI = 0.7-0.4] p=0.85  REFERENCE  RR = 1.0 [95% CI = 0.7-1.4] p=0.93  RR = 1.0 [95% CI = 0.7-1.5] p=0.84  RR = 1.1 [95% CI = 0.8-1.6] p=0.47  REFERENCE  RR = 1.3[95% CI = 0.9-1.9] p=0.15  RR = 0.9 [95% CI = 0.7-1.4] p=0.78  RR = 1.3 [95% CI = 0.9-1.9] p=0.10  REFERENCE  RR = 1.5 [95% CI = 1.0-2.3] p=0.06  **RR = 1.6 [95% CI =1.0-2.3] p=0.04**  **RR = 1.9 [95% CI =1.2-2.8] p<0.01**  **RR = 1.6 [95% CI =1.1-2.5] p=0.02**  **RR = 1.6 [95% CI =1.1-2.3] p=0.02**  **RR = 1.6 [95% CI =1.1-2.4] p=0.02**  REFERENCE  RR = 1.3 [95% CI =0.9-2.0] p=0.14  RR = 1.2 [95% CI =0.8-1.8] p=0.29  RR = 1.1 [95% CI =0.7-1.6] p=0.66  REFERENCE  **RR = 2.0 [95% CI =12-3.5] p=0.01**  **RR = 1.4 [95% CI = 1.9-10.0] p<0.01**  **RR = 2.8 [95% CI =1.4-5.6] p<0.01** | 92% |
| 1. Knapik, 2009 (29) Cohort Study | 451 women in Army Basic Training | **Age**  **Previous injury (Y/N)**  BMI  **Push-ups**  **Sit-ups**  **2 Mile Run**  **Smoking**  **Frequency of ex before BCT**  **Frequency of running before BCT** | 17.0-19.9yrs  20.0-24.9yrs  **25.0-29.9yrs**  **≥30yrs**  **(Y)**  15.20-22.12kg/m2  21.30-23.80kg/m2  23.81-25.97kg/m2  25.98-34.02kg/m2  **0-4 reps**  5-13 reps  14-22 reps  23-62 reps  **0-20 reps**  21-33 reps  34-46 reps  47-89 reps  12.3-19.4min  19.5-22.1min  22.2–24.7min  **24.8-31.3min**  **0**  **1-9/day**  **10-19/day**  **≥20/day**  **≤1/week**  **≤1/week** | | REFERENCE  HR = 1.02 [95% CI =0.85-1.23] p=0.84  **HR = 1.30 [95% CI =1.01-1.66] p=0.04**  **HR = 1.43 [95% CI =1.12-1.84] p<0.01**  **HR = 1.41 [95% CI =1.13-1.75] p<0.01**  REFERENCE  HR = 0.89 [95% CI = 0.71-1.11] p=0.30  HR = 0.91 [95% CI = 0.73-1.13] p=0.40  HR = 0.89 [95% CI = 0.71-1.11] p=0.28  **HR = 1.92 [95% CI =1.41-2.59] p<0.01**  HR = 1.36 [95% CI =0.99-1.86] p=0.06  HR = 1.20 [95% CI **=**0.87-1.65] p=0.27  REFERENCE  **HR = 1.75 [95% CI = 1.29-2.37] p<0.01**  HR = 1.34 [95% CI = 0.98-1.83] p=0.07  HR = 1.10 [95% CI = 0.79-1.51] p=0.58  REFERENCE  REFERENCE  HR = 0.99 [95% CI =0.71-1.38] p=0.94  HR = 1.14 [95% CI =0.82-1.59] p=0.43  **HR= 2.18 [95% CI =1.60-2.98] p<0.01**  REFERENCE  **HR = 1.44 [95% CI =1.19-1.73] p<0.01**  **HR = 1.47 [95% CI =1.17-1.89] p<0.01**  **HR = 1.90 [95% CI =1.34-2.68] p<0.01**  **HR 1.41 [95% CI =1.09-1.82p p<0.01**  **HR = 1.62 [95% CI =1.16-2.27] p<0.01** | 100% |
| 1. Kodesh, 2015 (30) Cohort Study | 158 females on Combat Fitness Instructor Course | Power Performance including 10m sprint, single leg triple hop drop jump, CMJ.  Body Fat %  BMI  FMS  2km Run | All power tests n/s except  **L triple hop (cm) 418 (254-559) vs 446.5 (199-584) p=0.029**  **R triple hop distance (cm) 434 (287-536) vs 460 (263-546) p=0.047)**  **BF% 23.7 (20.5-29.2) vs 22.5 (14.9-31.5) p=0.047.**  BMI 21.14 [18.06-25.79) injured vs 20.70 [16.16-32.03] not injured.  FMS n/s  **258 (578-776) sec vs 640 (488-804) sec p=0.044** | | | 67% |
| 1. Krauss, 2016 (31) Cohort Study | 1900 US Army recruits during first 183 days of service | Fit vs unfit  Fit (high % BF vs low % BF) | **Non stress fracture**  **Stress fracture**  **Non stress fracture**  Stress fracture | | **IRR = 1.32 [95% CI =1.14-1.53]**  **IRR = 1.62 [95% CI =1.19-2.21]**  **IRR = 1.27 [95% CI =1.07-1.50]**  IRR = 0.79 [95% CI =0.49-1.28] | 75% |
| 1. Rappole, 2018 (1) Cohort Study | 369 US female Army Soldiers | Age  2-mile run  Push-ups  Sit-ups  Unit PT resistance training  Personal PT run distance  Personal PT interval freq | n/s  n/s  n/s  n/s (at 0.05)  **≥1/week**  > 1 mile  **None/<1/week** | | **OR 1.96 [95% CI =1.20-3.21] p <0.01**  OR 1.57 [95% CI =0.98-2.52] p = 0.06  **OR 1.64 [95% CI =1.00-2.71] p=0.05** | 67% |
| 1. Roy, 2014 (2) Cohort Study | 625 in Us Army units | Deployment  Injury History (Y/N)  2-mile Run time  Unit Runs/week  Pers. PT/week  APFT score | 0  1  ≥2  **(Y)**  ≤17mins  **17.01-18.0**  > 18mins  **0**  0  **1-2**  ≥3  **<220**  **220-249**  **250-289**  ≥290 | | RR = 1.48 [**95% CI =**1.02-1.71]  RR = 1.22 [**95% CI =**0.84-1.78]  REFERENCE  **RR = 2.6 [95% CI =2**.06-3.28]  REFERENCE  **RR = 1.71 [95% CI = 1.07-2.73]**  RR = 1.41 [95% CI = 0.90-2.19]  **RR= 1.526 [95% CI =1.07-2.19]**  REFERENCE  **RR = 1.42 [95% CI =1.08-1.87]**  RR = 1.31 [95% CI =0.94-1.83]  **RR= 1.74 [95% CI =1.01-3.02]**  **RR = 2.01 [95% CI =1.19-3.38]**  **RR = 1.7 [95% CI =1.02-2.86]**  REFERENCE | 75% |
| 1. Roy, 2015 (33) Cohort Study |  | Work type  Miles walked/day.  Avg worn load.  Weight of avg lifted object | **Physically demanding**  **>4**  **>30lb**  **>50lb** | | **RR = 6.0 [95% CI = 1.50-23.99]**  **RR = 3.0 [95% CI = 1.52-5.93]**  **RR = 2.44 [95% CI = 1.7-4.36]**  **RR = 2.3 [95% CI = 1.19-4.45]** | 67% |
| 1. Roy, 2016 (32) Cohort Study | 160 deployed female soldiers | * Wearing load * Wearing armour * Wearing backpack * Occupational Tasks * Y balance score | **>10% body weight**  **Heaviest load >15%**  **1 hr – 4 hr**  **> 4 hrs**  **Y**  **Lifting >22.68kg**  **Lifting objects 1-2 x day**  **Carrying objects > 7.62m**  **< 95.23** | | **RR = 2.0 [95% CI = 1.31-3.06]**  **RR = 5.83 [95% CI = 1.51-22.50]**  **RR = 1.62 [95% CI = 1.002-2.62]**  **RR = 1.84 [95% CI = 1.03-3.27]**  **RR = 1.85 [95% CI = 1.23-2.80]**  **RR = 1.96 [95% CI = 1.08-2.97]**  **RR = 1.73 [95% CI = 1.002-2.97]**  **RR = 2.01 [95% CI = 1.19-3.42]**  **RR = 1.71 [95% CI = 1.13-2.60]** | 100% |