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500 words

TITLE: Gender Differences in Load Carriage Injuries of Australian Army Soldiers

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BACKGROUND:

Soldiers are required to carry loads of up to 50kg or more while performing combat tasks, often in unpredictable and hostile environments. Removal of gender restrictions in combat arms trades of military forces, combined with the changing nature of warfare, means female soldiers are more frequently exposed to heavy military load carriage.

PURPOSE:

To determine relative risks and patterns of injuries, including serious personal injuries (SPI), associated with contemporary military load carriage in female compared to male soldiers.

METHODS:

Using key search terms, the Australian Regular Army's (ARA) workplace injury database was searched to identify all reported injuries sustained during load carriage events over a two-year period'. Descriptive analysis was performed and relative injury risks were calculated, by gender. Ethics approval for the research was granted by the Australian Defence Human Research Ethics Committee, and the Behavioural and Social Sciences Research Ethics Committee of The University of Queensland.

RESULTS

Records of 401 reported injuries associated with load carriage were identified from a total 1954 ARA injury records for the study period. The mean ARA population sizes in the study period constituted 2441 female and 22435 male soldiers. Commensurate with the gender ratio, 10% (n=40) of the reported injuries were sustained by female soldiers and 90% (n=361) by male soldiers, with the relative injury risk for female soldiers compared to males being 1.02 (95% CI 0.74 to 1.41). The most common site of injury for both genders was the back (F: n=11, 27%; M: n=80, 22%). For female soldiers the foot was the second most common site of injury (n=8, 20%), followed by the 'neck and shoulder' and knee (n=5, 12%). For male soldiers the ankle (n=60, 17%) and knee (n=40, 11%) were the next most common sites of injury. Fifteen percent (n=6) of injuries in female soldiers and 6% (n=23) of injuries in males were classified as SPI,

giving a relative risk of SPI for female compared to male soldiers of 2.40 (95% CI 0.98 to 5.88). For both female and male soldiers, the lower back was the leading site for SPI (F: n=3, 43%: M: n=8, 29%). Systemic illness, through heat stress, was also a leading 'site' of injury in male soldiers (n=8, 29%) but not in females (n=1, 14%).

CONCLUSION

The back was the leading site of injury and SPI in male and female soldiers. The typically smaller statures of female soldiers may have predisposed them to their observed higher risk of suffering SPI while carrying loads. Female soldiers reported a high proportion of foot injuries while male soldiers experienced a high proportion of ankle injuries. This finding warrants investigation of the relationships between military boot types, gender and load carriage injuries.

IMPLICATIONS:

- Back strength-endurance may be a useful outcome measure when planning return-to-training for soldiers following injury.
- Dedicated load carriage reconditioning following injuries sustained to the back (both genders), foot (female soldiers) and ankles (males) is required to mitigate risk of future load carriage injuries.

KEYWORDS: military, load carriage, injuries, gender