

Burden of Influenza like illness (ILI) among Congregate Military Populations

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Abstract

Background: Respiratory illnesses have placed a significant health burden on the United States Armed Forces for decades, particularly in military trainees. Up to 300,000-400,000 of new cases of respiratory illness result in clinical encounters in the US military annually, affecting 200,000-600,000 personnel. In congregate populations such as trainees, the impact is far greater. Due to crowding and stressors such as physiological stress from training, new recruits are 29 times more likely to be hospitalized for respiratory infection than service members with over one year of service. Lost training days due to illness can significantly impact operational readiness. Clinic based surveillance may underestimate the true ILI burden because trainees with ILI may not seek health care for fear of missing training, facilitating the spread of respiratory pathogens. To uncover the true ILI burden, we estimated the incidence of ILI in trainees irrespective of whether they sought care.

Methods: A prospective cohort study was conducted among US Army recruits in a 9-week basic combat training course at Ft. Benning, GA, in January 2017. Staggered bi-weekly visits were performed to collect nasal swab and data of ILI symptoms from trainees in two platoons. Symptom diary cards were available to the trainees to record their daily symptoms. For each day, they recorded having fever/chills/feverish feeling, cough, sore throat and sneezing. ILI was defined as reporting fever/chills/feverish feeling, cough and/or sore throat. Trainees with ILI were identified by two ways: 1) those who sought health care at clinics for their ILI and 2) those who did not seek care but reported ILI on their symptom cards. Attack rate was calculated as number of trainees with ILI divided by number of participants in the study.

Results: A total of 78 recruits participated in the study. The participants were male and the mean age was 21 yo (SD 4.9). In the first two weeks of training, eight recruits reported to outpatient clinics for their ILI, resulting in an attack rate of 10%. Fifty-five recruits returned symptom diary cards with at least 13 days of records between visit 1 and visit 2. Among them, four trainees visited clinics for ILI while additional fourteen trainees reported at least one day of ILI without seeking health care. The proportion of patients not seeking care was 78%. The attack rate of self-reported ILI (to health clinics or on symptom cards) was 33% (18/55). The self-reported ILI participants reported a median of 2 days of having ILI (Range: 1-7 days).

Conclusions: Our data show that the majority of trainees who reported having ILI did not seek health care. The attack rate based on clinic attendance largely underestimated the burden of ILI. Understanding reasons and obstacles of trainees not seeking care would be crucial in infection control and reduction of ILI transmission among basic training recruits who are at high risk of ILI.

Background

Acute respiratory infections (ARI) remain a significant cause of morbidity and pose an important threat to operational readiness to the US military. ARI are leading cause of outpatient illnesses and are responsible for up to 33% of infectious disease hospitalizations in US active duty personnel. It is estimated that ARI accounts for approximately 500,000 clinical encounters among service members each year. These infections are also estimated to be responsible for about 115,000 lost duty days annually. New recruits and advanced trainees are at greatest risk for infection compared to older, experienced service members. Research is needed on the transmission, epidemiology and etiology of ARI to reduce their burden in congregated military trainee populations.

Methods

Design: From Jan to March 2017, we conducted a longitudinal pilot study to: 1) describe ILI distribution and determinants, and 2) detail respiratory pathogens detected in Sx and Asx participants

Population: The study comprised US Army recruits beginning a 9-week Basic Combat Training (BCT) cycle at Ft. Benning, GA.

Methods: Staggered, bi-weekly visits occurred from reception through the 9 week training period, with nasal swabs and surveys (all visits) and blood draws at reception and weeks 8 and 9. Nasal specimens will be obtained for the detection of viral and bacterial pathogens using the Diatherix TEM-PCR respiratory panel. Blood samples were obtained for future serologic testing.

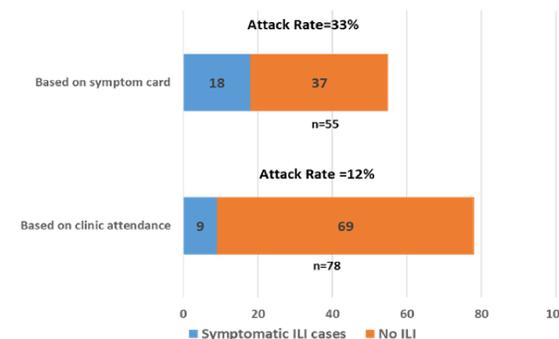
Influenza-like Illness (ILI) case definition: An ILI case is defined as a recruit enrolled in the study and has either an oral temperature > 38.0°C (100.4°F), or subjective fever/chills, in addition to cough/sore throat, with onset ≤ 7 days.

Results

Characteristic (n=78)	n	%
Caucasian	41	53
Median age: 21 yrs (IQR 19-24 yrs)		
High school/GED	59	76
Current Smoker	10	13
Exposed to 2 nd Hand smoke	43	55
≥ 4 residents in same HH prior to enrollment	43	55
Children < 5 yrs in HH	18	23
Cover mouth/nose with elbow for sneeze/cough	73	94
Wash hands after sneeze/cough	52	67
Use hand sanitizer after sneeze/cough	52	67
Received influenza vaccine in current season	10	13
Close to ILI case in past 2 wks prior to enrollment	18	23
Had ILI at enrollment	12	15
Had ILI within 2 wks prior to enrollment	12	15

The Hidden Burden of ILI in Recruits

Symptomatic ILI attack rate in first two weeks of training



Results (cont.)

ILI Cases: Viral Pathogen Distribution

Total (n=18)

Pathogens	n (%)
Human coronavirus 229E + Influenza A	1 6
Human coronavirus 229E + Rhinovirus	2 11
Human coronavirus 229E + Enterovirus	1 6
Human coronavirus HKU1 + Rhinovirus	1 6
Human coronavirus 229E	1 6
Human Rhinovirus OC43	1 6
Enterovirus + Rhinovirus	3 17
Enterovirus	1 6
Rhinovirus	2 11
No detection	5 28

Conclusions

- The attack rate based on clinic attendance largely underestimated the burden of ILI.
- Symptomatic ILI associated with coronavirus, rhinovirus, and enterovirus, in addition to influenza in the early weeks of training.
- Understanding reasons and obstacles of trainees not seeking care would be crucial in infection control and reduction of ILI transmission among basic training recruits who are at high risk of ILI.
- Next steps:
 - Describe ILI transmission patterns
 - Summarize operational burden
 - Study ILI dynamics in larger trainee cohort

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