Military Service Outcomes among Volunteers with Inflammatory Bowel Disease in the Israel Defense Forces: A Retrospective Cohort Study

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ABSTRACT **Background:** Inflammatory bowel disease (IBD) is a chronic relapsing condition affecting millions worldwide, often diagnosed during young adulthood and associated with significant functional impairment. The Israel Defense Forces (IDF) allows citizens with IBD and other chronic medical conditions to volunteer for military service through a special medical volunteer program. No comprehensive study has examined the impact of military service on disease progression or military performance.

Objectives: To evaluate the association between IBD and military service-related outcomes, including service completion and occupational stability, among IDF medical volunteers.

Methods: In this retrospective study, we examined 734 volunteer soldiers with IBD who served in the IDF between 2019 and 2024. Data were collected from computerized medical records and included demographic, occupational, and medical information.

Results: Among 734 IBD volunteers, 96.7% successfully completed their military service. Male sex (odds ratio 3.73) and lower sick leave utilization (odds ratio 3.13) were key predictors of service completion in multivariable analysis.

Conclusions: The findings suggest that the vast majority of IBD volunteers successfully completed military service, with male sex and lower sick leave utilization as predictors of completion. Given these outcomes, consideration should be given to including carefully selected IBD patients within the standard medical classification system, based on individualized assessment of disease stability and functional capacity, with a non-combat profile, rather than through the volunteer program.

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KEY WORDS: Crohn's disease (CD), inflammatory bowel disease (IBD), military service, ulcerative colitis (UC)

Inflammatory bowel disease (IBD), encompassing Crohn's disease (CD) and ulcerative colitis (UC), represents a significant global health burden. Global prevalence has reached approximately 4.9 million cases in 2019, with the highest prevalence in China (911,405 cases) and the United States (762,890 cases) [1]. Annual incidence rates vary significantly by region: 10.5–46.14 per 100,000 in Europe, 7.3–30.2 per 100,000 in North America, and 1.37–1.5 per 100,000 in Asia [2].

The economic burden of IBD is substantial. In the United States, annual direct healthcare costs average $22,987 per patient versus US$6956 for non-IBD controls, representing a three-fold increase [3]. Lifetime incremental costs reach US$416,352 for CD and US$230,102 for UC when diagnosed at any age [4]. Direct costs are primarily driven by pharmaceuticals (63–76% of medical costs), with biologic therapy representing the largest expense category [5]. Total estimated costs for IBD in the United States range between US$14.6 and US$31.6 billion annually [6]. This burden underscores the importance of enabling productive vocational participation among IBD patients

IBD in military populations presents unique challenges. In U.S. military healthcare populations, IBD prevalence is 348 cases per 100,000 [7]. Military medical classification systems in many countries consider IBD patients unfit for military service. For example, U.S. military regulations explicitly list a history of inflammatory bowel disease as a disqualifying condition [8]. However, emerging evidence suggests that individuals with controlled IBD may successfully perform military duties.

A prospective study of 16 Israeli Air Force aviators with IBD over 23 years demonstrated successful con-

tinuation of flying duties, with all aviators being able to continue operational roles and no events of sudden incapacitation [9].

In Israel, IBD prevalence has reached 519 per 100,000 population (0.52%) by 2019, affecting 46,074 patients nationwide [10]. In Israel military service is mandatory for medically fit. At present, candidates with IBD are considered unfit for military service. The IDF implemented a medical volunteer program allowing individuals with chronic medical conditions, including IBD, to serve when their condition is stable and manageable.

Prior to enlistment, each volunteer undergoes a comprehensive medical evaluation, based on which individual service conditions, role limitations, and required medical follow-up are determined. Regarding ongoing care, volunteers diagnosed prior to enlistment continue treatment through their health maintenance organization, while those diagnosed during service are treated by the IDF medical corps; in both cases, routine follow-up is provided by the unit clinic throughout the service period.

Despite growing literature on IBD in military populations, comprehensive studies examining outcomes of volunteer military service among IBD patients remain limited. This study aims to analyze military service outcomes among IDF volunteers with IBD, examining service completion rates, occupational performance, and medical outcomes.

PATIENTS AND METHODS

STUDY DESIGN AND PARTICIPANTS

This retrospective cohort study examined 734 volunteers with IBD aged 17–29 years who served in the IDF between 1 January 2019 and 31 December 2024. The study period was defined by the initiation of a dedicated medical tracking program for volunteers with chronic conditions by the IDF Medical Classification Branch in 2019, which enabled systematic identification and follow-up of this population. Recruits with incomplete medical documentation were excluded.

The IDF medical volunteer program allows individuals with chronic medical conditions such as IBD and diabetes to serve when their condition is stable and compatible with military service. Volunteers undergo comprehensive medical evaluation and receive assignments based on medical profile and capabilities.

MEASURES

Background variables

Background variables included sex, country of birth (Israel/other), religion (Jewish/other), and education (years), as well as cognitive function score, which was assessed using the Initial Psychotechnical Rating (Dapar) score. The Dapar score is a standardized cognitive assessment administered to all IDF recruits. Participants were categorized and grouped for analysis according to standard Dapar score ranges: 10–30 (low), 40–60 (medium), and 70–90 (high) [11].

Independent variables

Independent variables included sick leave utilization throughout their entire service period (0–30 days and ≥ 31 days), hospitalization during service (none/one or more episodes), and type of service (combat/non-combat). Primary outcomes were service completion (24 months of military service or more among volunteers) and occupational stability. Secondary outcomes encompassed occupational stability, which included maintaining the original military role or transitioning to an equivalent or more significant position throughout service period.

Data were extracted from IDF's computerized medical records and administrative databases. Demographic variables included sex, birth country, religion, and cognitive function score [11]. Medical data included hospitalization history and sick leave utilization. Service data included role assignments, service completion, and occupational changes.

STATISTICAL METHODS

Descriptive statistics were conducted for all sociodemographic parameters, and chi-square test was performed to examine the association between these variables and the main outcome, which is service completion. Follow-up continued until discharge from military service or 31 December 2024, whichever came first. Statistical significance was set at $P < 0.05$. Binary logistic regression was performed to examine the independent contribution of each variable to the outcome. Statistical analyses were performed using IBM Statistical Package for the Social Sciences statistics software, version 29 (SPSS, IBM Corp, Armonk, NY, USA).

ETHICS CONSIDERATIONS

The study was approved by the IDF Medical Corps Research Committee [No.2495-2025]. Data were anonymized prior to analysis.

RESULTS

The study included 734 volunteer soldiers with Inflammatory bowel disease. Table 1 presents the distribution of their demographic, cognitive, medical and military service characteristics.

Of the total cohort, 437 (59.5%) were male, most participants were Israel-born (n=689, 93.8%) and 289 (39.3%) were assigned as combat support (serving in combat units in non-combat roles). Most of the volunteers had high cognitive scores (n=281, 38.3%), and 716 (97.5%) had no hospitalization during the time of the study. Service completion rate was 96.7% for the study population (n=710), and 683 (93%) maintained their role throughout service.

In the unadjusted analysis [Table 2], sex and sick leave utilization were significantly associated with service completion (odds ratio [OR] 3.51, 95% confidence interval [95%CI] 1.18–10.38, P = 0.016, and OR 2.93, 95%CI 1.27–6.74, P = 0.008, respectively). A notable finding was that 95.8% (n=277) volunteers who served in combat units (in non-combat roles) completed 24 months of service.

Table 3 presents the multivariable logistic regression model, adjusted for sex and sick leave utilization. Both variables were independently associated with service completion. Male sex was linked to increased odds of service completion (OR 3.73, 95%CI 1.25–11.07, P = 0.018), and volunteers with lower sick leave utilization (0–30 days) had significantly higher odds of service completion compared to those with ≥ 31 sick days (OR 3.13, 95%CI 1.35–7.25, P = 0.008).

Table 1. Baseline characteristics (N=734)

Variable	Category	n (%)
Sex	Male	437 (59.5)
	Female	297 (40.4)
Country of birth	Israel	689 (93.8)
	Other	45 (6.1)
Religion	Jewish	728 (99.1)
	Other	6 (0.8)
Cognitive score (Dapar index)	Low	26 (3.5)
	Medium	247 (33.6)
	High	281 (38.2)
Unit type	Combat unit	289 (39.3)
	Non-combat unit	445 (60.6)
Sick leave utilization	0–30	586 (79.8)
	> 31	148 (20.1)
Hospitalization	None	716 (97.5)
	1 or more	18 (2.5)
Occupational stability	Changed profession	51 (7.0)
	Maintained original profession	683 (93.0)
Service completion	Yes	710 (96.7)
	No	24 (3.2)

DISCUSSION

This analysis of 734 IBD volunteers demonstrates high military service integration, with a service completion rate of 96.7% and occupational stability maintained by 93% of participants. These findings challenge traditional assumptions regarding IBD incompatibility with military service. While data on IBD outcomes in military settings remain limited, prior studies of Israeli Air Force aviators with IBD demonstrated that, following disease stabilization, affected individuals were able to continue operational flying duties over prolonged follow-up periods [9,12]. These findings align with broader evidence suggesting that chronic conditions do not necessarily preclude military service when adequately managed. Enlistees granted medical waivers for other chronic conditions have been shown to achieve retention rates comparable to fully qualified peers [13]. In the civilian occupational context, IBD has been associated with significant work productivity loss and impaired quality of working life, driven largely by fatigue and presenteeism even in patients without active disease [14]. These findings underscore the functional demands placed on IBD patients in structured, high-demand environments such as military service.

The observation that only 7% required reassignment to less demanding positions suggests that appropriate initial assignment may be effective for IBD management in military settings. Medical outcomes, with hospitalization rates of 2.5%, were substantially lower than the 1025%– annual rates typical in civilian IBD populations [15], suggesting that military environments may provide conditions conducive to disease stability.

The association between male sex and service completion may reflect sex-related differences in perceived symptom burden, psychosocial impact, or functional

Table 2. Proportions and odds ratio of service completion

Variable	Category	n (%)	Service completion: n, (%)	Early discharge: n, (%)	OR (95%CI)	*P*-value
Sex	Male	437 (59.5)	417 (95.4)	20 (4.6)	3.51 (1.18–10.38)	0.016
	Female	297 (40.4)	293 (98.7)	4 (1.3)		
Country of Birth	Israel	689 (93.8)	665 (96.5)	24 (3.5)	0.96 (0.95–0.98)	0.203
	Other	45 (6.1)	45 (100)	0 (0)		
Religion	Jewish	728 (99.1)	705 (96.8)	23 (3.2)	0.03 (0.02–0.05)	< 0.01
	Other	6 (0.8)	0 (0)	1 (16.7)		
Cognitive score (Dapar index)	Low	26 (3.5)	26 (100)	0 (0)	–	0.279
	Medium	247 (33.6)	239 (96.76)	8 (3.23)		
	High	281 (38.2)	266 (94.6)	15 (5.33)		
Unit type	Combat unit	289 (39.3)	277 (95.8)	12 (4.2)	1.56 (0.69–3.52)	
	Non-combat unit	445 (60.6)	433 (97.3)	12 (2.7)		
Sick leave utilization	0–30	586 (79.8)	572 (97.6)	14 (2.4)	2.93 (1.27–6.74)	0.008
	> 31	148 (20.1)	138 (93.2)	10 (6.8)		
Hospitalization	None	716 (97.5)	692 (96.6)	24 (3.4)	0.96 (0.95–0.98)	0.43
	1 or more	18 (2.5)	18 (100)	0 (0)		
Occupational stability	Changed profession	51 (7)	48 (94.1)	3 (5.9)	0.50 (0.14–1.76)	0.27
	Maintained original profession	683 (93)	662 (96.9)	21 (3.1)		

95%CI = 95% confidence interval, OR = odds ratio

Table 3. Multivariable logistic regression analysis of factors associated with service completion among IDF volunteers with IBD

Variable	OR (95%CI)	*P*-value
Sick leave utilization	3.13 (1.35–7.25)	0.008
Sex	3.73 (1.25–11.07)	0.018

We used binary logistic regression evaluating the association of sex and sick leave utilization with service completion.

coping rather than biologically milder disease in men. Women with IBD have been shown to report greater quality-of-life impairment and occupational impact than men [16-18], which may contribute to the observed difference in service completion rates.

Study limitations included volunteer selection bias, which limited extrapolation to mandatory service scenarios in the Israeli military context and may limit generalizability to other military organizations. The volunteer nature of this population represents individuals with potentially more stable disease presentation who felt capable of military service. Findings should not be generalized to all IBD patients. In addition, the study lacked clinical data on IBD subtype (Crohn's disease vs. ulcerative colitis), disease activity and remission status at enlistment, medication use, and prior surgical history, which are variables that would be essential for developing individualized eligibility criteria. Medical records within the military system capture service-related events, while ongoing disease management is largely conducted through the civilian healthcare system. These detailed clinical records were not accessible for this study. Future studies should incorporate these clinical parameters to better define which patients are most suitable for military service.

CONCLUSIONS

This study demonstrates that IBD volunteers can achieve high military service completion rates (96.7%) and occupational stability (93%), challenging traditional assumptions about IBD incompatibility with military service. These findings support reconsideration of rigid diagnostic exclusion policies and highlight the need for individualized, evidence-based assessment frameworks that consider disease stability and functional capacity rather than diagnosis alone.

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Capsule

Ectopic NMDAR expression in cancer unmasks germline-encoded autoimmunity

Autoimmunity and anti-cancer immunity lie on the same biological continuum, but their link remains obscure. The paraneoplastic neurological syndrome ANRE (anti-NMDA receptor (NMDAR) encephalitis) is a paradigm for their connectivity, given that intratumoral NMDAR expression is correlated with the generation of anti-NMDAR antibodies. **Kleeman** and colleagues verified ectopic expression of GluN1 and GluN2B NMDAR subunits in triple-negative breast cancer (TNBC) and model this using orthotopic TNBC tumors with inducible expression of GluN1–GluN2B NMDARs. The authors showed that NMDAR expression is sufficient to induce the recruitment of B cells and their affinity maturation, consistent with an integrated adaptive immune response. Reconstruction of extended intratumoral B cell phylogenies and cryogenic electron microscopy structural analyses demonstrate that affinity-matured hypermutated and class-switched antibodies emerged from pre-existing germline-configuration lower-affinity anti-NMDAR antibodies. Distinct matured antibodies targeted specific epitopes and induced conformational rearrangements within the NMDAR amino-terminal domain, predictive of their functional effects, ranging from inhibition to potentiation. Passive transfer of an NMDAR-potentiating antibody caused autonomic dysregulation and lowered the seizure threshold in healthy female mice, recapitulating key diagnostic criteria of ANRE. The authors further identify a correlation between intratumoral NMDAR expression and anti-NMDAR antibody titers in patients with TNBC. Taken together, these data establish a direct connection between intratumoral NMDAR expression, antibody maturation and the onset of autoimmunity. These findings suggest that germline-encoded anti-NMDAR antibodies contribute to immune surveillance but can also trigger autoimmune disease after maturation, revealing a mechanistic trade-off between cancer immunity and neurotoxicity.

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