Clinical findings for the first 1000 Gulf war veterans in the Ministry of Defence's medical assessment programme

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Abstract

Objective To review the clinical findings in the first 1000 veterans seen in the Ministry of Defence's Gulf war medical assessment programme to examine whether there was a particular illness related to service in the Gulf.

Design Case series of 1000 veterans who presented to the programme between 11 October 1993 and 24 February 1997.

Subjects Gulf war veterans.

Main outcome measures Diagnosis of veterans' conditions according to ICD-10 (international classification of diseases, 10th revision). Cases referred for psychiatric assessment were reviewed for available diagnostic information from consultant psychiatrists.

Results 588 (59%) veterans had more than one diagnosed condition, 387 (39%) had at least one condition for which no firm somatic or psychological diagnosis could be given, and in 90 (9%) veterans no other main diagnosis was made. Conditions characterised by fatigue were found in 239 (24%) of patients. At least 190 (19%) patients had a psychiatric condition, which in over half was due to post-traumatic stress disorder. Musculoskeletal disorders and respiratory conditions were also found to be relatively common (in 182 (18%) and 155 (16%) patients respectively).

Conclusion Many Gulf war veterans had a wide variety of symptoms. This initial review shows no evidence of a single illness, psychological or physical, to explain the pattern of symptoms seen in veterans in the assessment programme. As the veterans assessed by the programme were all self selected, the prevalence of illness in Gulf war veterans cannot be determined from this study. Furthermore, it is not known whether the veterans in this study were representative of sick veterans as a group.

Introduction

From September 1990 to June 1991 over 53 000 British troops were deployed to the Gulf region. Since the end of the Gulf war, some UK veterans have become unwell, with various symptoms.[1 2] In 1993 the Ministry of Defence set up a Gulf war medical assessment programme to assess the health of veterans who believed that their health had been affected by service in the Gulf. It was established as a clinical programme to assess individual veterans and, if necessary, to refer them on for specialist help. It was later realised that a more systematic research programme was needed. Only in this way could it be determined whether the Gulf war had led to the emergence of a new syndrome or to a higher than expected incidence of known disease. We report the clinical findings for the first 1000 Gulf war veterans in the assessment programme.

Methods

Assessment process

The assessment programme offered veterans and their partners a consultation with a consultant physician. Before the appointment, service medical records were retrieved where available. At the consultation patients completed a short questionnaire about their military service and relevant experiences in the Gulf, including exposure to potentially harmful factors. A detailed history was taken and a clinical examination carried out.

Some investigations were performed routinely (box). Further investigations were carried out if clinically indicated. The results of the clinical examination and investigations were sent to the patient's general practitioner. Referral to a specialist, if indicated, was either arranged within the Defence Medical Services or recommended to the patient's general practitioner.

By October 1994 the programme's consultant physicians recognised that almost a third of patients displayed one or more psychological symptoms. For the next 12 months all patients were referred for assessment by service psychologists. If this indicated a possible psychiatric disorder, patients were offered a consultation with a service consultant psychiatrist. Psychological assessment was discontinued in October 1995. Thereafter, if the programme's consultant physicians wished to obtain a psychiatric opinion they would either refer the patient directly to a service consultant psychiatrist (if the patient was still in military service) or advise the patient's general practitioner to refer to a local psychiatrist.

Case series

The case series comprises the first 1000 Gulf war veterans who had attended the assessment programme by

Routine tests administered in medical assessment programme

- Full blood count
- Blood chemistry tests: urea and electrolytes, liver function, thyroid function, serum calcium and phosphate, creatinine, C reactive protein, creatine phosphokinase, sugar, immunoglobulins, serum electrophoresis
- Serology tests: amoebic indirect fluorescent antibody test, tests for borrelia, brucella, and cytomegalovirus, phase 2 complement fixation test for coxiella, test for Epstein-Barr virus, enterovirus screen, tests for Leishmaniasis A and B, Lyme disease, and sandfly fever
- Urine analysis, including midstream urine, for microscopy and culture
- Electrocardiography
- Chest radiography
- Abdominal ultrasonography
- Lung function tests

24 February 1997. Patients' records were validated against a Ministry of Defence database of serving personnel who had been in the Gulf region at some time during 1 September 1990 to 30 June 1991. Eighty other patients (results not included here) were also seen during this period; they had seen active service elsewhere, were partners of a Gulf war veteran, or had worked in the Gulf as civilians.

Diagnoses

From 1993 to 1995 most patients were seen by one service consultant physician (WJC), with occasional help from another. In 1996 a second, full time consultant joined the programme. From October 1996 to February 1997, owing to the large number of referrals made at the time, 14 other service consultant physicians, accredited in general (internal) medicine, helped for short periods. As the programme had not originally been established to produce standardised data, in September 1997 the two principal physicians on the programme (WJC and BMB) reviewed all cases for this study, using copies of the letters sent out to general practitioners, according to certain criteria (box).

Reviewing criteria

- Diagnoses were coded according to ICD-10 (international classification of diseases, 10th revision)
- When no firm diagnosis was possible, a symptom diagnosis was made—classified in chapter 18 (Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified)
- Each condition was assessed as either a "main" or a "secondary" condition, based on the impact on the patient's morbidity at the time of the clinical assessment; patients could be diagnosed as having several main conditions and several secondary conditions
- The conditions were assessed as initially affecting the patient before, during, or after the Gulf war
- Patients attending owing to a concern with their own health or that of their children born since the war or with the reproductive health of their partners were allocated a diagnosis from chapter 21 (Factors influencing health status and contact with the health services)
- Patients with "inappropriate fatigue for over 6 months" were given a diagnosis of chronic fatigue syndrome. For patients seen in the early period of the programme the criteria formulated by the Centers for Disease Control and Prevention in Atlanta, Georgia, were used.[3] Subsequently the Oxford criteria were used.[4] We have not reviewed the diagnoses made on the basis of the former set of criteria

Psychiatric diagnoses

The programme's consultant physicians made provisional psychiatric diagnoses when they believed the following conditions were clinically possible: *(a)* schizophrenia and schizotypal and delusional disorders (ICD-10, codes F20-29), *(b)* mood disorders (F30-39), *(c)* anxiety disorders (F40-41), and *(d)* reactions to severe stress (F43). They then either referred the patient directly to a service consultant psychiatrist (for serving personnel) or advised the patient's general practitioner to make a referral. We obtained information about psychiatric diagnoses from the service hospital psychiatric departments (for the first group) and patients' general practitioners (for the second). We carried out the same procedures for the patients who had been referred for routine psychological assessment and a possible psychiatric consultation between September 1994 and October 1995.

Thus all psychiatric diagnoses detailed in this study were made by consultant psychiatrists. If a patient had not been referred or had failed to attend the consultation or if the general practitioner had no knowledge of the patient, the data have not been included. In these cases the patients' symptoms have been recorded, but no formal psychiatric diagnoses have been given.

Results

Annual enrolment in the assessment programme increased during the study period: after the first 2 patients in 1993, 55 patients were seen in 1994, 258 in 1995, and 578 in 1996. A further 107 patients were seen in 1997 up to 24 February.

Demographic characteristics of patients

Table 1 presents comparative sociodemographic information for the first 1000 patients seen, all personnel who served in the Gulf at some time during 1 September 1990 to 30 June 1991, and all those in service elsewhere on 1 January 1991. A greater proportion of study patients than Gulf war veterans overall were reservists (7% *v* 2%) or women (5% *v* 2%); a smaller proportion were officers (9% *v* 11%); and a greater proportion were army personnel (77% *v* 70%). The mean age among the patients was slightly higher (28 years *v* 27 years).

Presenting symptoms

Patients presented with a wide variety of symptoms, which were grouped into 19 broad categories (table 2) similar to those used by physicians examining US Gulf war veterans for the Department of Veterans Affairs and the Department of Defense.[5] The veterans in our study had a median of five symptoms; 191 patients had 10 or more recorded symptoms. Affective symptoms,

Table 1 Sociodemographic data for 1000 Gulf war veterans in study, all Gulf veterans, and personnel serving elsewhere. Values are numbers (percentages) of veterans

	Study veterans (n=1000)	All Gulf veterans (n=53 462)	Veterans serving elsewhere (n=248 033)*
Service:			
Army	768 (77)	37 434 (70)	113 141 (46)
Royal Navy	66 (7)	5 964 (11)	55 960 (23)
Royal Air Force	166 (17)	10 064 (19)	78 932 (32)
Sex:			
Men	954 (95)	52 227 (98)	230 590 (93)
Women	46 (5)	1 235 (2)	17 443 (7)
Rank:			
Officers	86 (9)	5 956 (11)	36 661 (15)
Lower ranks	911 (91)	47 506 (89)	211 372 (85)
Type of engagement:			
Regulars	927 (93)	52 370 (98)	247 466 (100)
Reservists	68 (7)	1 092 (2)	567 (0.2)
Age on 1 January 1991 (years):			
<20	78 (8)	6 376 (12)	32 862 (13)
20-	330 (33)	18 988 (36)	67 367 (27)
25-	225 (23)	12 874 (24)	53 054 (21)
30-	186 (19)	7 886 (15)	37 466 (15)
35-	101 (10)	4 347 (8)	26 898 (11)
≥40	79 (8)	2 991 (6)	30 386 (12)

Information was lacking on engagement type for five patients, on rank for three patients, and on age for one patient.
*On 1 January 1991.

Table 2 Symptoms and complaints in 1000 Gulf war veterans in study

Symptom	No of patients
Affective problems	494
Fatigue	421
Joint and muscle aches and pains	395
Cognitive problems	261
Headaches and migraines	256
Shortness of breath, respiratory problems, coughs, and chest pains	243
Vomiting, diarrhoea, and stomach problems	218
Sleep disturbance	212
Rashes, skin problems, and hair loss	194
Ear, nose, and throat problems	153
Genitourinary problems	114
Pins and needles, and numbness	114
Sweating and fevers	105
Weight changes	96
Dizziness, blackouts, and loss of consciousness	80
Eye problems	72
Alcohol and drug abuse	60
Colds, flus, and unspecified minor infection	48
Reproductive problems	26
Not classified/other	193
No symptoms	74

such as mood swings, personality change, irritability, and depression, were common complaints, occurring in 49% of all patients. Fatigue was the next most common complaint (42%), followed by joint and muscle pain (40%) and cognitive symptoms (such as short term memory loss and difficulty concentrating) (26%).

Clinical findings

Table 3 summarises the recorded diagnoses. Altogether, 588 patients were diagnosed with more than one condition; 182 patients were diagnosed with conditions classified as diseases of the musculoskeletal system and connective tissue; 178 patients had a diagnosis of a mental or behavioural disorder (excluding the psychiatric disorders mentioned above), 87 of whom were diagnosed with the chronic fatigue syndrome; 155 patients had diseases of the respiratory system, of which asthma was the most common diagnosis (100 patients); and 137 patients had diseases of the digestive system.

Over a third of patients (387) had a condition for which no firm somatic or psychological diagnosis could be given, and whose symptoms were classified as "symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified"; table 4 shows the symptom diagnoses for the patients whose main condition was in this category. Ninety of these patients had no other main diagnosis, and, of these, 51 had a symptom diagnosis of fatigue, lethargy, or malaise. If all the patients with symptom diagnoses of fatigue are added to those with confirmed chronic fatigue syndrome, 239 patients had a main condition characterised by fatigue.

Ninety five patients were concerned about infertility, their partner's health, or the possibility of congenital damage in their offspring. Fifty two patients were in the programme because they were concerned about their long term health and had attended solely for a medical check up.

Psychiatric diagnoses

The cases of 501 patients were reviewed for diagnostic information from a consultant psychiatrist, either because a provisional psychiatric diagnosis had been

Table 3 Diagnoses in 1000 Gulf war veterans, by ICD-10 chapter. Values are numbers (percentages) of patients

Chapter title (codes)	Any condition (n=1000)	Main condition (n=991)	Secondary condition (n=319)	Onset			
				Before war (n=121)	During war (n=113)	After war (n=903)	Not determined (n=91)
1—Certain infectious and parasitic diseases (A00-B99)	31 (3)	18 (2)	13 (4)	0	1 (1)	29 (3)	1 (1)
2—Neoplasms (C00-D48)	41 (4)	26 (3)	16 (5)	3 (2)	3 (3)	29 (3)	6 (7)
3—Diseases of the blood and the blood-forming organs and certain disorders involving the immune mechanism (D50-89)	13 (1)	9 (1)	4 (1)	0	1 (1)	12 (1)	0
4—Endocrine, nutritional, and metabolic diseases (E00-90)	61 (6)	32 (3)	33 (10)	5 (4)	0	46 (5)	10 (11)
5—Mental and behavioural disorders (excluding psychiatric disorders) (F00-19, F44-99)	178 (18)	157 (16)	26 (8)	7 (6)	12 (11)	158 (17)	3 (3)
6—Diseases of the nervous system (G00-99)	104 (10)	89 (9)	16 (5)	4 (3)	6 (5)	92 (10)	3 (3)
7—Diseases of the eye and adnexa (H00-59)	10 (1)	8 (1)	2 (1)	0	1 (1)	8 (1)	1 (1)
8—Diseases of the ear and the mastoid process (H60-95)	18 (2)	9 (1)	9 (3)	2 (2)	2 (2)	12 (1)	2 (2)
9—Diseases of the circulatory system (I00-99)	43 (4)	22 (2)	23 (7)	4 (3)	1 (1)	39 (4)	0
10—Diseases of the respiratory system (J00-99)	155 (16)	126 (13)	33 (10)	19 (16)	28 (25)	112 (12)	1 (1)
11—Diseases of the digestive system (K00-93)	137 (14)	92 (9)	48 (15)	10 (8)	11 (10)	115 (13)	2 (2)
12—Diseases of the skin and subcutaneous tissue (L00-99)	86 (9)	65 (7)	21 (7)	7 (6)	9 (8)	68 (8)	2 (2)
13—Diseases of the musculoskeletal system and connective tissue (M00-99)	182 (18)	121 (12)	68 (21)	17 (14)	6 (5)	160 (18)	7 (8)
14—Diseases of the genitourinary system (N00-99)	55 (6)	34 (3)	21 (7)	5 (4)	4 (4)	44 (5)	2 (2)
15—Pregnancy and childbirth and the puerperium (O00-99)	1 (0)	1 (0)	0	0	0	1 (0)	0
16—Certain conditions originating in the perinatal period (P00-96)	1 (0)	1 (0)	0	0	0	1 (0)	0
18—Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified (R00-99):	387 (39)	271 (27)	159 (50)	6 (5)	24 (21)	364 (40)	8 (9)
No diagnosis in any other chapter	90 (9)	90 (9)	40 (13)	2 (2)	8 (7)	81 (9)	2 (2)
19 and 20—Injury, poisoning and certain other consequences of external causes and external causes of morbidity and mortality (S00-Y98)	18 (2)	9 (1)	9 (3)	2 (2)	11 (10)	6 (1)	0
21—Factors influencing health status and contact with health services (Z00-99):	156 (16)	112 (11)	44 (14)	32 (26)	0	75 (8)	54 (59)
No diagnosis in any other chapter	53 (5)	48 (5)	2 (1)	2 (2)	0	24 (3)	27 (30)

Some patients had several diagnoses within the same ICD-10 chapter.

made or because they had been routinely referred for psychological assessment. Information was obtained for 233 patients. Post-traumatic stress disorder was diagnosed for 115 of these patients (12% of all patients in the study seen, 49% of those with psychiatric information) (table 5). Other psychiatric disorders were diagnosed in another 75 patients; 43 patients had no psychiatric illness.

Of the 115 patients in whom post-traumatic stress disorder had been diagnosed, 15 also had a diagnosis of a depressive illness, 10 had a diagnosis of alcohol misuse, 11 had asthma, 7 had the chronic fatigue syndrome, and 11 had fatigue as a symptom diagnosis. Of all patients in the programme, 39 had a diagnosis of alcohol misuse and 10 a diagnosis of drug misuse.

Table 4 Diagnoses of conditions in 269 Gulf veterans whose main diagnosis was classified in chapter 18 (Symptoms, signs, and abnormal clinical and laboratory findings) of ICD-10. Values are numbers (percentages) of patients

Coding group (ICD-10)	Illness or group of conditions	Main diagnosis in chapter 18 (n=269)	No other main diagnosis (n=90)
R00-09	Involving circulatory and respiratory systems	46 (17)	13 (14)
R10-19	Involving digestive system and abdomen	16 (6)	5 (6)
R20-23	Involving skin and subcutaneous tissue	23 (9)	7 (8)
R25-29	Involving nervous and musculoskeletal systems	9 (3)	3 (3)
R30-39	Involving urinary system	10 (4)	3 (3)
R40-46	Involving cognition, perception, emotional state, and behaviour	98 (36)	46 (51)
R41 and R45	Symptoms and signs involving cognitive functions and awareness and those involving emotional state	94 (35)	45 (50)
R47-49	Involving speech and voice	1 (0.4)	1 (1)
R50-69	General symptoms and signs	191 (70)	61 (68)
R53	Malaise and fatigue	142 (53)	51 (57)

Some patients had several conditions.

Table 5 Psychiatric disorders in 233 Gulf war veterans for whom psychiatric infomation was available. Values are numbers (percentages) of patients

Coding group (ICD-10)	Illness or group of conditions	Patients known to have been seen by psychiatrist (n=233)
F30-39	Mood (affective) disorders (including depressive illness)	55 (24)
F41	Anxiety disorders	11 (5)
F43.1	Post-traumatic stress disorder	115 (49)
F43.2	Adjustment disorders	34 (15)
F43.9	Reactions to severe stress, unspecified	4 (2)
F20-29, F50-59	Other psychiatric conditions	4 (2)
	No psychiatric illness	43 (18)

Some patients had several conditions; a psychiatric disorder was diagnosed in 190 patients.

Discussion

Limitations

We report here a self selected case series. We do not know how many veterans who have left the armed forces have been treated by their general practitioners without being referred to the medical assessment programme or have received specialist treatment in their local hospital. Nor do we have all the results of the psychiatric assessments that we advised should take place. Therefore, patients in the programme may not be representative of sick Gulf war veterans as a whole. Furthermore some veterans may have had difficulty attending programme consultations. Patients who were able to attend without difficulty were more likely to be followed up regularly, whereas many patients were seen only once.

The programme was not designed as a research tool. Clinical diagnoses were made by 17 consultant physicians, although two consultants saw 80% of patients between them. Diagnostic criteria may have varied between consultants, and it was only when the programme was well under way that diagnostic agreement was reached over conditions such as the chronic fatigue syndrome. More importantly, no denominator or comparison data were available. Owing to these many factors we cannot show the incidence or prevalence of disease among Gulf war veterans.

Symptoms and diagnoses

Patients in the programme had multiple symptoms and frequently more than one diagnosis. The group of 387 patients with conditions for which no firm somatic or psychological diagnosis could be given, includes 90 veterans with persistent symptoms in whom only a symptomatic diagnosis could be made as a main diagnosis. In this group of 90 patients, 51 had a symptom based diagnosis of "fatigue and malaise" (table 4) and 45 had a symptom based diagnosis of either "symptoms and signs involving emotional state" or "other symptoms and signs involving cognitive functions and awareness." Overall, fatigue was a symptom in 421 (42%) of all patients, of whom 87 were diagnosed with the chronic fatigue syndrome; affective symptoms occurred in 49% and cognitive problems in 26%.

At least 19% of patients had a psychiatric condition (psychiatric follow up data were lacking in 268/501 cases), which in nearly a half was due to post-traumatic stress disorder. The prevalence of a psychiatric condition and of post-traumatic stress disorder is unknown as follow up data were not available for all the patients for whom psychiatric referral was advised.

Assessment programmes in United States

In the United States separate assessment programmes exist for people who have left the armed forces after serving in the Gulf and for service personnel on active duty (respectively, the Department of Veteran Affairs Persian Gulf registry, established in August 1992, and the Department of Defense comprehensive clinical evaluation programme, established in June 1994). The clinical procedures adopted and the services provided differ. In the Persian Gulf registry there is a two stage assessment; in the clinical evaluation programme the patients may be referred for secondary specialist opinion and some to a tertiary specialized care programme. No counterpart exists in Britain. The US programmes also record differing numbers of diagnoses per patient and use ICD-9CM (clinical modification), not ICD-10. By May 1997, 67 989 veterans had been seen at the Persian Gulf registry,[6] and by March 1997, 26 252 had been seen in the clinical evaluation programme (J Riddle, personal communication, 1999).

Of 5970 patients who had attended the Persian Gulf registry's phase 2 examinations by May 1997, 35% were diagnosed with "musculoskeletal and connective tissue conditions," 32% with "mental disorders," 28% with "loss of memory and other general symptoms." For 21% there was "no medical diagnosis."

Of 20 000 patients seen in the clinical evaluation programme by March 1996, 19% had "diseases of the musculoskeletal system," 18% "mental disorders," and 18% "signs, symptoms and ill defined conditions." Of those with a primary diagnosis of a "mental disorder," 19% had a "tension headache," 17% had a "major depressive disorder not elsewhere classified," and 15% had "prolonged post-traumatic stress disorder." [5]

Although there are similarities between our main findings and those of the two US programmes, specific comparisons are difficult. All three programmes report a substantial proportion of patients with conditions that are not readily diagnosed or classifiable; these proportions, however, vary. In particular, we cannot compare the prevalence of psychiatric disorders, including post-traumatic stress disorder, in these populations. In addition to the differences mentioned above, the United States also runs a readjustment counselling service (originally for Vietnam war veterans), which over 80 000 Gulf war veterans have attended.

Our study showed that fatigue, joint and muscle aches and pains, and affective symptoms (such as mood swings and anxiety) were the most common symptoms. Many other symptoms occurred, but no clinically consistent pattern existed to suggest a common underlying disease process. The problem is essentially one of case definition. A recent US study proposed a symptom based case definition for the illnesses occurring in Gulf war veterans.[7] A case was defined as the presence of one or more chronic symptoms of at least six months' duration from at least two of three categories (fatigue, mood cognition, and musculoskeletal problems). The definition was derived from a study of 1155 randomly selected US Air Force Gulf war veterans, of whom 45% met the proposed case definition. In addition, 15% of the comparison group of 2520 veterans who had not been deployed to the Gulf, also met the case criteria. This case definition was designed as a research tool to focus future research efforts rather than as a set of diagnostic criteria, and as our population consists of self selected, mostly ill veterans, and we do not have standardised data on the duration of symptoms, we cannot derive meaningful comparative data for our case series.

Conclusions

Many Gulf war veterans present with a wide variety of symptoms. US Gulf war veterans seem to report symptoms more often than their non-deployed peers.[7 8] We found no evidence of a single illness, psychological or physical, to explain the pattern of symptoms that we have seen. Conditions characterised by fatigue are common, as are musculoskeletal and respiratory conditions. Although post-traumatic stress disorder in these veterans could often be ascribed to Gulf war service, it was usually impossible to determine the link between other reported conditions and Gulf war service. A recent study showed, however, that war service in the past has often been associated with illness occurring in the postwar period.[9] Many of the symptoms reported in war related conditions such as Da Costa's syndrome and the effort syndrome are similar to the symptoms of patients in the medical assessment programme. Could some of the illnesses in the Gulf war veterans be explained by a postwar syndrome?

Key messages

- Many Gulf war veterans present with a wide variety of symptoms
- No single cause has been found to explain these symptoms
- From a clinical standpoint the variety and multiplicity of symptoms makes it unlikely that any single cause will be found to underlie Gulf war illness
- Some of the illnesses may be an example of a postwar syndrome

WJC was head of the medical assessment programme from its inception in 1993 until December 1996. BMB was head of the medical assessment programme from January to July 1997. NFB has been seconded from the Office for National Statistics to the Ministry of Defence since 1995, to work on research into the health of Gulf war veterans. JTG has been working on Gulf health issues, particularly research, in several posts since August 1995.

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