Menopausal symptom burden and response to hormone therapy in military-affiliated women: a prospective comparative cohort study

A. D. Uro-Nile, M. G. Mukhamedova

[Institution and department to be supplied by the author]

Corresponding author: A. D. Uro-Nile, e-mail: __

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Abstract

Objective. To examine menopausal symptom burden and 12-week outcomes associated with hormone therapy in women with military obligations.

Materials and methods. A prospective, non-randomised cohort included 186 women aged 40–50 years during 2023–2025. Hormone therapy was prescribed to 94 women; 92 received no hormone therapy. The Menopause Rating Scale (MRS) was assessed at baseline and 12 weeks. Reported adjusted estimates and safety outcomes were extracted from the source research.

Results. Baseline MRS scores were higher in the hormone-therapy group, 18.4 ± 6.8 versus 14.2 ± 5.9. At 12 weeks, the respective scores were 10.2 ± 4.6 and 13.4 ± 5.7. The adjusted between-group difference was −5.9 points (95% CI −7.4 to −4.4; $p < 0.001$). A reduction of at least 30% occurred in 72 of 94 treated women (76.6%). Adverse effects were reported in 28.7%, and six women discontinued treatment. No serious adverse event was reported during the observation period.

Conclusion. Hormone therapy was associated with lower short-term symptom scores. Non-random allocation, baseline imbalance and limited safety follow-up prevent the observed difference from being interpreted as a definitive treatment effect or a long-term safety estimate.

Keywords: perimenopause; hormone therapy; Menopause Rating Scale; military-affiliated women; occupational stress; sleep

Introduction

Menopausal symptoms may become clinically important before menstruation has ceased. For women whose work includes night duties and sustained physical demands, the clinical assessment also needs to distinguish vasomotor symptoms from sleep loss, fatigue and occupational strain. The presence of several complaints does not establish that each has the same cause.

Randomised evidence supports a reduction in vasomotor symptoms with low-dose estradiol, but the magnitude of improvement depends on the intervention, comparator and outcome definition [1]. Occupational studies have also examined approaches directed at the burden of symptoms at work rather than hormone concentrations alone. In MENOS@Work, self-help cognitive behaviour therapy addressed problematic hot flushes and night sweats in employed women [2]. These are related but distinct therapeutic questions.

The present study examined women with military obligations attending military medical institutions in Uzbekistan. Its principal question was whether symptom scores differed after 12 weeks between women prescribed hormone therapy and those managed without it. A second question concerned the baseline clinical context, including sleep disturbance and work-related strain.

Materials and methods

Design and participants

The source research describes a prospective observational comparison conducted during 2023–2025. A total of 186 women aged 40–50 years were included. Hormone therapy was prescribed to 94 women on clinical grounds. The comparison group comprised 92 women who did not receive hormone therapy because of milder symptoms, refusal, contraindications or concerns about treatment. Allocation was therefore not random.

This manuscript uses the aggregate results reported in the supplied research chapters. No new patient-level dataset was generated, and published group statistics were not used to simulate individual observations. Baseline and 12-week measurements form the main analytical period.

Clinical assessment and endpoints

The principal outcome was the total MRS score. A response was defined in the source analysis as a reduction of at least 30% from baseline. The Hospital Anxiety and Depression Scale, Pittsburgh Sleep Quality Index (PSQI) and menopause-specific quality-of-life questionnaire were included in the wider assessment. Anthropometry, hormone measurements and selected metabolic tests were also recorded.

Sleep and occupational exposures were considered separately from menopausal symptoms. The source recorded years of service, the frequency of night or 24-hour duties, perceived stress and smoking. Anti-Müllerian hormone was measured in 112 women, and ambulatory blood-pressure monitoring was available in 64. These subsets were not treated as complete measurements for the entire cohort.

Treatment exposure and follow-up

Hormone therapy was an individually prescribed exposure rather than a single uniform regimen randomly assigned by the investigator. The aggregate results do not support a comparison of specific formulations, routes or doses. Treatment effectiveness is therefore reported at the group level. Adverse effects and treatment discontinuation were recorded separately; more than one adverse effect could occur in one participant.

Although 128 women had a 24-week assessment, corresponding group-specific denominators were not available in the selected results. Numerical 24-week comparisons were not included. This restriction preserves a common, clearly documented period for the principal comparison.

Statistical approach

Continuous results are presented as mean ± standard deviation unless otherwise stated. The source used parametric or non-parametric comparisons according to distribution, categorical tests, analysis of covariance and logistic regression. The adjusted MRS comparison included baseline MRS, age, body mass index, stress and smoking. Odds ratios and confidence intervals are reproduced as reported, not recalculated from aggregate means. All model estimates remain exploratory because individual records and a validation sample were unavailable.

Results

Clinical burden at enrolment

The mean age of the overall cohort was 45.3 ± 3.1 years. Average service duration was 14.8 ± 5.6 years, and night or 24-hour duties occurred 4.7 ± 2.3 times per month. Perceived stress averaged 6.2 ± 1.8 on a visual analogue scale. Smoking was reported by 12.4% of participants.

Table 1. Baseline and 12-week characteristics of the treatment groups

Measure	Hormone therapy (n = 94)	No hormone therapy (n = 92)
Body mass index, kg/m²	26.8 ± 4.2	27.1 ± 3.9
Baseline MRS, points	18.4 ± 6.8	14.2 ± 5.9
12-week MRS, points	10.2 ± 4.6	13.4 ± 5.7
Mean within-group change	−8.2	−0.8
Within-group p value	<0.001	0.210
MRS reduction ≥30%, n/N (%)	72/94 (76.6)	Not reported

Values are mean ± SD unless specified. Baseline MRS: $p < 0.001$ between groups; body mass index: $p = 0.620$. Change is the difference between reported group means, not a new paired-data estimate.

The higher baseline MRS score in the treated group is important for interpretation. Clinical indication influenced treatment selection, and the groups were not exchangeable at entry. A larger unadjusted reduction in the treated group could partly arise from this initial difference; the adjusted result is therefore reported alongside the raw scores.

Sleep disturbance was common across the whole cohort. The mean PSQI was 8.1 ± 3.4, and 72.6% had a score above five. These findings concern the baseline population and should not be interpreted as a treatment-specific sleep outcome.

Distribution of presenting symptoms

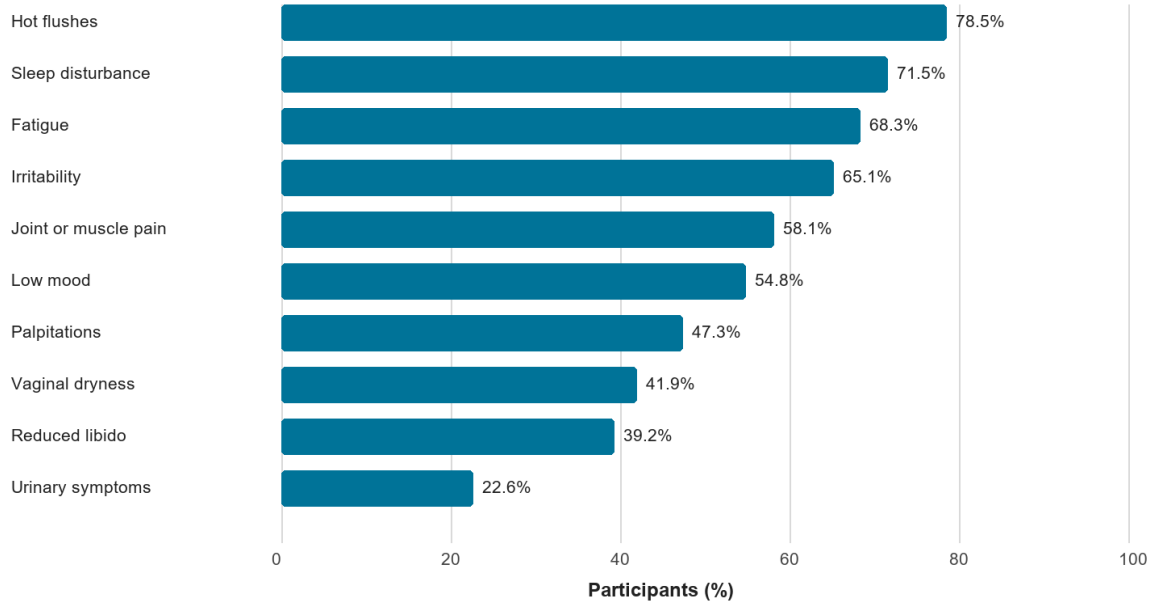


Figure 1. Baseline symptom frequencies in the full cohort (n = 186).

Reported percentages are shown. Symptoms were not mutually exclusive; absolute counts were not reconstructed from rounded percentages.

Hot flushes and sleep disturbance were the most frequently reported complaints. Fatigue and irritability were also common, whereas urinary complaints were less frequent. The distribution supports assessment of several symptom domains rather than reliance on the presence of hot flushes alone.

The correlation between duty frequency and PSQI was reported as $r = 0.44$ ($p < 0.001$). This association does not establish which exposure preceded sleep disturbance. It does, however, identify a work-related factor that should not be absorbed into the interpretation of the MRS total as a purely endocrine measure.

Adjusted symptom outcome and response characteristics

At 12 weeks, the adjusted between-group difference in MRS was −5.9 points in favour of the hormone-therapy group (95% CI −7.4 to −4.4; $p < 0.001$). In treated participants, daily hot-flush frequency declined from 8.4 ± 3.2 to 2.6 ± 1.8; 34% reported no hot flushes at follow-up. These outcomes were not accompanied by the same complete hot-flush dataset for the untreated group.

Table 2. Reported factors associated with a ≥30% MRS reduction among treated women

Factor	Odds ratio	95% CI	p
Age <47 years	2.84	1.22–6.61	0.015
Body mass index <28 kg/m²	2.18	1.04–4.57	0.038
Non-smoking	2.42	1.08–5.44	0.032
Baseline estradiol >80 pmol/L	1.96	0.92–4.18	0.080

Source logistic-regression estimates. The estradiol association did not reach the stated significance threshold. These thresholds are exploratory and are not validated treatment-selection rules.

Age, body mass index and smoking status were associated with the recorded response in the source model. The confidence interval for estradiol crossed one. It would therefore be inappropriate to present all four factors as established independent predictors.

A separate baseline symptom model included follicle-stimulating hormone, stress, duty frequency, body mass index and smoking. Its reported R^2 of 0.413 concerned the complete model. It must not be attributed to occupational stress alone. Neither model provides evidence that changing a single predictor would reproduce the corresponding association.

Change in total symptom score

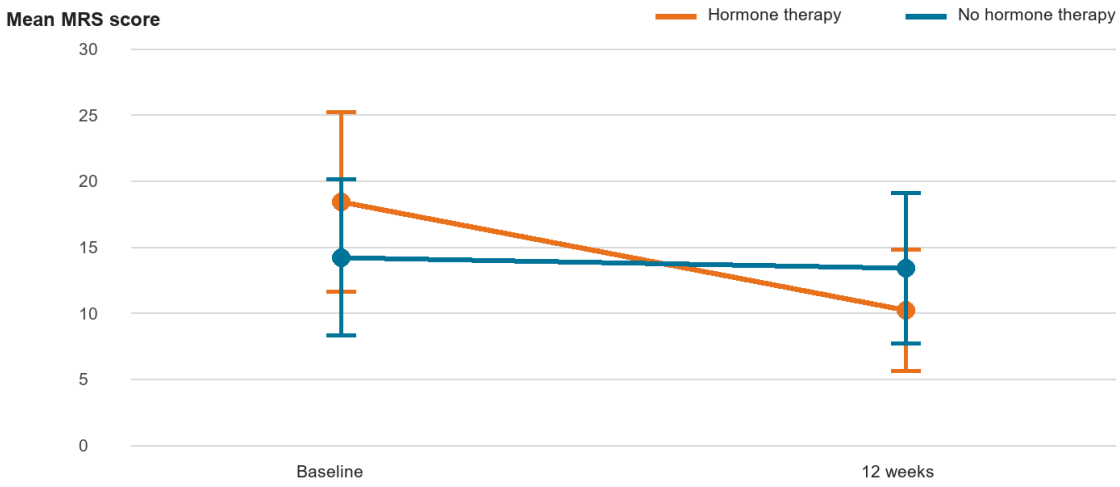


Figure 2. Mean MRS scores at baseline and 12 weeks.

Error bars represent SD. The lines join the two observed group means and do not describe intermediate measurements.

The separation at follow-up arose from a marked reduction in the treated group and a smaller change in the comparison group. The untreated within-group change was not statistically significant ($p = 0.210$). The plot should be read with the baseline imbalance rather than as a substitute for the adjusted analysis.

A response threshold summarises improvement for clinical communication, but it does not retain the full information contained in a continuous score. The 76.6% response proportion is specific to the selected treated group, its baseline symptom burden and the 12-week assessment. It is not a population-wide probability of benefit.

Tolerability

Table 3. Treatment tolerability in the hormone-therapy group

Outcome	Result
Any recorded adverse effect	28.7%
Treatment discontinuation	6/94 (6.4%)
Serious adverse event	None reported
Available 24-week assessments, all groups	128/186 (68.8%)

The number with longer follow-up is provided only to describe data availability. It was not used as a denominator for treatment-specific safety estimates.

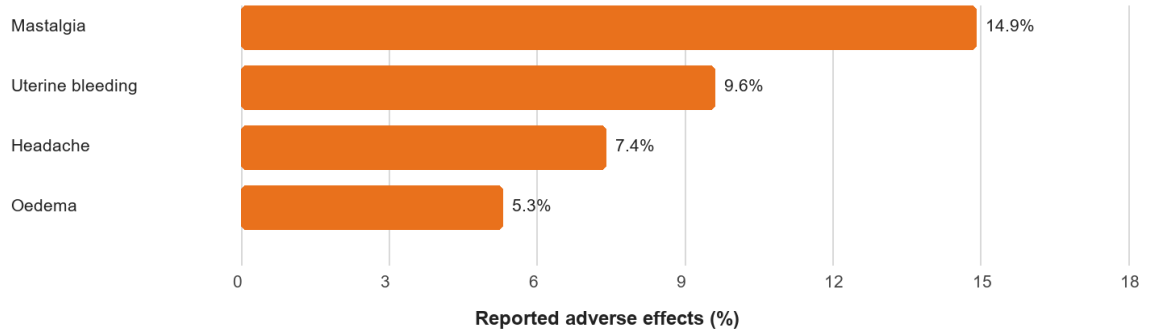


Figure 3. Selected reported adverse effects during hormone therapy.

Events could overlap within one participant. Percentages therefore must not be added to estimate the number of affected women.

The absence of reported serious events in this cohort does not establish long-term safety. The observation period and sample size were not suited to estimating rare vascular, malignant or other delayed outcomes.

Discussion

The principal finding is a lower 12-week symptom score among women prescribed hormone therapy, including after adjustment for selected baseline differences. The direction is compatible with randomised evidence for vasomotor symptom relief [1]. However, the present endpoint was a broader MRS total, and treatment was selected clinically. A direct numerical comparison of effect size across the two designs would be misleading.

Occupational circumstances remain clinically relevant even when hormone therapy is effective. Sleep disturbance and duty frequency were associated at baseline, and treatment cannot be assumed to remove the effects of an irregular work schedule. The MENOS@Work trial evaluated a symptom-focused behavioural approach in employed women [2]. Its outcomes offer a separate perspective on functioning at work; they do not identify which part of the present MRS change was hormonal or work-related.

Mood also requires an independent assessment. A randomised trial of transdermal estradiol with micronised progesterone examined prevention of depressive symptoms during the menopause transition [3]. That endpoint differs from both vasomotor frequency and total MRS. The present aggregate dataset cannot determine whether improvement in mood mediated improvement in the overall symptom score.

Limitations

Treatment allocation was non-random and strongly related to baseline symptom burden. Contraindications and patient preferences also influenced group membership. Adjustment can address only recorded variables and cannot remove all confounding by indication. Formulation-specific effectiveness, adherence and treatment switching could not be reconstructed from the aggregate summaries.

The analyses of response factors were exploratory. No external validation or patient-level assessment of missingness was available. Longer-term results were omitted because the treatment-group denominators were unclear. Adverse-effect surveillance was short and could not support conclusions concerning rare harm. The findings apply to the documented clinical cohort, not to all women in military service or to an unrestricted community population.

Conclusion

In this prospective observational cohort, hormone therapy was associated with a clinically substantial reduction in total menopausal symptom burden over 12 weeks. The adjusted MRS difference was −5.9 points, while 76.6% of treated women met the predefined response threshold. Interpretation requires attention to non-random treatment selection, occupational sleep disruption and the limited duration of safety follow-up.

Declarations

Data provenance. Numerical results were taken from the supplied research chapters identified in the accompanying source audit. No synthetic patient records or new effect estimates were introduced.

Ethics and consent. Consent was described in the source eligibility criteria. The ethics committee name, the approval number and the approval date require author confirmation before submission.

Author information, funding and competing interests. The author name is retained from the supplied file designation. The full author details, the official English affiliation, the corresponding e-mail, author contributions, funding sources and competing interests require confirmation.

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