

# Assessment of strength fitness indicators in women of early mature age under the influence of individualized fitness programs in a war-affected environment

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## Abstract

### *Background and Study Aim*

Maintaining physical fitness in adulthood is an essential component of health preservation and functional stability, particularly under conditions of prolonged environmental stress. In recent years, individual fitness programs have been widely applied to improve strength performance and overall physical condition in women of early mature age. However, under conditions of sustained military impact and increased psycho-emotional load, the adaptive response to systematically dosed strength training may acquire specific characteristics that require contextual consideration. Although various strength-oriented fitness approaches are implemented in practice, their relative effectiveness in enhancing strength preparedness among women living in a war-affected environment remains of practical interest. The aim of the study was to assess changes in strength fitness indicators in women of early mature age under the influence of individualized fitness programs in a war-affected environment.

### *Material and Methods*

The study involved 10 women of early mature age (21–30 years), divided into two subgroups (21–25 and 26–30 years). The experiment lasted five months and was conducted under war-affected environmental conditions. Participants performed individually designed strength-oriented fitness programs. Strength preparedness was assessed before and after the intervention using a battery of tests evaluating maximal strength, strength endurance, and speed-strength abilities (plank, leg press, deadlift hold, standing long jump, vertical jump, squats, push-ups, and sit-ups). Data were analyzed using descriptive statistics and Student's t-test for dependent samples, with statistical significance set at  $p < 0.05$ .

### *Results*

The findings demonstrated positive changes in most strength fitness indicators in both age subgroups following the five-month intervention. Statistically significant improvements ( $p < 0.05$ ) were observed in leg press, standing long jump, deadlift hold, and squats tests, with the most pronounced gains recorded in abdominal strength endurance in the younger subgroup ( $p < 0.01$ ). In women aged 26–30 years, significant progress was additionally noted in the plank test. Some indicators, including vertical jump and single-leg squats, did not reach statistical significance. Overall, individualized strength-oriented programs resulted in measurable improvements in strength preparedness under war-affected conditions.

### *Conclusions*

Positive changes in strength preparedness indicators were observed in women of early mature age following participation in individualized strength-oriented fitness programs conducted under war-affected environmental conditions. Due to the single-group pre–post design and absence of a control group, the findings should be interpreted as preliminary within-sample changes rather than causal evidence of effectiveness. Nevertheless, the results demonstrate the feasibility of implementing personalized strength training approaches in crisis-affected environments.

### **Keywords:**

individualized fitness programs, strength preparedness, early mature age women, war-affected environment, strength training, physical activity adaptation, Ukraine

## Introduction

Strength-oriented training in the format of individualized fitness programs has become an important component of maintaining health and work capacity in women of early mature age. For women,

strength preparedness is associated not only with the development of muscular strength and endurance, but also with the prevention of unfavorable changes in body composition, preservation of functional capacity, and improvement of quality of life. Under conditions of prolonged war-related stress and residence in a frontline region, physical activity acquires additional significance as a resource for

self-regulation, maintenance of psycho-emotional stability, and preservation of daily activity. At the same time, the effectiveness of strength training in such conditions depends on individualized load prescription, appropriate exercise selection, and systematic monitoring of changes in strength indicators.

Strength preparedness is considered a key component of physical condition that determines the body's ability to generate muscular force and maintain functional performance in various types of activity [1]. The mechanisms underlying strength development are associated with neuromuscular adaptations, muscle fiber hypertrophy, and optimization of intermuscular coordination, which collectively contribute to improvements in strength performance in response to systematic training loads [2]. The effectiveness of resistance training largely depends on the rational organization of load parameters, including frequency, volume, periodization, and nutritional support, as confirmed by systematic reviews and meta-analyses [3, 4, 5]. Contemporary international guidelines emphasize the importance of regular physical activity and resistance exercise for adult populations in order to maintain health and prevent functional decline [6, 7]. At the same time, chronic psycho-emotional stress has been shown to influence levels of physical activity and physiological adaptation, potentially modifying training effectiveness [8], which becomes particularly relevant under war-affected environmental conditions.

Recent studies by Ukrainian scholars emphasize the practical aspects of designing individualized fitness programs for individuals of different age and sex groups. The main structural components of strength-oriented programs have been identified, including load variability, the integration of strength and functional exercises, and consideration of the individual morphofunctional characteristics of women of early mature age [9, 10]. The effectiveness of modern fitness modalities, including elements of martial arts and functional training, has been highlighted for the development of motor abilities and body composition correction in mature women [11, 12]. Experimental studies have also demonstrated the positive impact of strength training on the development of motor abilities and overall physical fitness [13].

Recent research further indicates that the effectiveness of physical exercise and its impact on functional and psycho-emotional status largely depend on environmental conditions and the level of stress exposure [14, 15]. Systematic reviews and randomized controlled trials confirm that regular physical activity contributes to improved mental health and reduction of post-traumatic stress symptoms across diverse social contexts [16, 17]. Thus, the current stage of fitness technology

development is characterized by an emphasis on individualized training approaches, safe load prescription, and consideration of the psycho-emotional context of participants' daily lives.

Military actions in Ukraine have led to significant changes in the lifestyle of the population, affecting levels of physical activity, psycho-emotional status, and functional indicators across different age groups. Studies conducted among university students under conditions of armed conflict have demonstrated a decline in physical activity levels and changes in motivational attitudes toward exercise participation [18, 19, 20]. At the same time, an association has been established between physical activity levels and stress-related conditions, confirming the role of regular exercise in maintaining psychophysical well-being [21, 22]. Investigations of autonomic nervous system functioning in students residing in war-affected regions have revealed adaptive changes associated with increased psycho-emotional load [23]. Furthermore, analyses of professional readiness among future physical education specialists and the adaptation of physical activity assessment tools under war conditions emphasize the need to reconsider approaches to organizing motor activity in contemporary social realities [24, 25, 26]. Thus, the war-affected environment functions as a complex contextual factor that transforms the structure and conditions of physical activity, highlighting the necessity for individualized training approaches to maintain strength preparedness in women of early mature age.

Analysis of previous research findings has demonstrated that the development of strength preparedness is an important factor in maintaining functional capacity and psychophysical well-being in women of early mature age. Researchers emphasize the necessity of individualized training programs, safe load prescription, and consideration of the psycho-emotional context of participants' daily lives. At the same time, the organization of individualized fitness programs and the assessment of their impact on strength preparedness under prolonged war-related environmental conditions are characterized by specific adaptive and organizational features, underscoring the need for experimental investigation of this issue.

The aim of the study was to assess changes in strength fitness indicators in women of early mature age under the influence of individualized fitness programs in a war-affected environment.

## Materials and Methods

### *Participants*

The study involved 10 women of early mature age (21–30 years) who attended the fitness club "Athletic Hall" (Kharkiv, Ukraine). Based on age, participants were allocated into two subgroups: Group A (21–25

years,  $n = 5$ ) and Group B (26–30 years,  $n = 5$ ). All participants had previous experience in recreational fitness training but were not professional athletes. Participant recruitment was conducted under war-affected environmental conditions, characterized by limited access to training facilities, disruptions in daily routines, and increased psycho-emotional stress. The study was carried out in a region located in close proximity to active military operations. The organization of training sessions was influenced by air raid alerts, temporary infrastructure disruptions, and restrictions in daily mobility, which created additional challenges for maintaining consistent participation. These circumstances limited the possibility of enrolling a larger sample. Inclusion criteria comprised the absence of medical contraindications to resistance training and regular attendance throughout the entire intervention period. Participation was voluntary.

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki for research involving human participants. All participants provided written informed consent prior to participation. Confidentiality and anonymity of personal data were ensured. Participants were informed of their right to withdraw from the study at any time without consequences.

#### *Study Design*

The study had an experimental design and was conducted in 2025 over a five-month period under ongoing war-related conditions. The intervention was implemented in a commercial fitness club setting.

Training sessions were organized in a small-group format; however, each participant followed an individually prescribed strength-oriented training program. Individualization was based on baseline fitness assessment, age subgroup, and functional capabilities. Programs were developed and supervised by a certified fitness trainer with professional experience in strength training and recreational fitness.

Participants trained three times per week. Each session lasted approximately 60 minutes and included a standardized warm-up (10–12 minutes), a main strength-training component (40–45 minutes), and a cool-down phase (5–8 minutes). The main part of the session consisted of multi-joint and accessory strength exercises targeting major muscle groups. Load progression was applied gradually through adjustment of resistance, number of repetitions, and number of sets, according to individual adaptation and tolerance.

Training intensity and safety were monitored during each session by the supervising trainer. Attendance was recorded throughout the intervention period. In cases of air raid alerts, training sessions were temporarily interrupted and

transferred to a basement area of the facility that met safety requirements for civil protection during alert conditions.

#### *Testing Procedures*

Physical testing was conducted at baseline and after completion of the five-month intervention under standardized indoor conditions in the same fitness facility. All assessments were performed at approximately the same time of day to minimize circadian variability.

Before testing, participants completed a standardized warm-up. The following tests were used to assess maximal strength, speed-strength, and strength endurance (static and dynamic):

- plank hold;
- leg press (1RM equivalent or submaximal load);
- standing long jump;
- barbell deadlift hold;
- squats in 20 seconds;
- vertical jump;
- push-ups in 20 seconds;
- single-leg squats;
- sit-ups in 30 seconds.

Each test was demonstrated beforehand, and participants were familiarized with the procedures. Verbal encouragement was standardized. Two attempts were allowed where applicable, and the best result was recorded.

#### *Statistical Analysis*

Statistical analyses were performed using Microsoft Excel (Microsoft Corporation, Redmond, WA, USA). Descriptive statistics are presented as mean  $\pm$  standard deviation (SD). Pre–post differences within each subgroup were analyzed using a two-tailed Student's *t*-test for dependent samples. Normality of difference scores was assessed using the Shapiro–Wilk test. For each paired comparison, Cohen's *d* for dependent samples was calculated as a measure of effect size. In addition, 95% confidence intervals (CI) for mean differences were computed. Given the number of outcome comparisons performed within each subgroup, the results should be interpreted as exploratory. Statistical significance was set at  $p < 0.05$  (two-tailed). No interpretation of “statistical trends” was applied.

## **Results**

The comparative results of strength fitness indicators in Group A (21–25 years) and Group B (26–30 years) at baseline and after the five-month intervention are presented in Table 1. In addition to pre- and post-intervention values, absolute changes ( $\Delta$ ) are provided to facilitate evaluation of the magnitude of training-induced adaptations within each subgroup.

As shown in Table 1, both groups demonstrated positive changes across the majority of assessed strength indicators. In Group A, statistically

**Table 1.** Strength fitness indicators of women Group A (aged 21–25 years, n = 5) and Group B (aged 26–30 years, n = 5) at the beginning and at the end of the experiment

Indicators	Group	Baseline (M± SD)	Post-intervention (M± SD)	Δ (Post–Pre)	95% CI	Cohen's d	p
Plank, s	A	51.0±2.37	55.4±2.11	+4.4	[-6.71 ; 15.51]	0.49	>0.05
	B	45.0±0.79	47.8±0.74	+2.8	[-0.19 ; 5.79]	1.16	<0.05
Leg press, kg	A	80.0±0.79	88.8±2.22	+8.8	[2.20 ; 15.40]	1.66	<0.05
	B	66.0±2.89	80.0±0.79	+14.0	[5.74 ; 22.26]	2.10	<0.01
Standing long jump, cm	A	145.0±0.50	149.6±0.57	+4.6	[1.33 ; 7.87]	1.74	<0.05
	B	128.0±6.07	145.0±0.50	+17.0	[0.14 ; 33.86]	1.25	<0.05
Deadlift hold, s	A	34.8±1.98	44.8±1.98	+10.0	[2.29 ; 17.71]	1.61	<0.05
	B	30.2±2.33	39.8±1.98	+9.6	[1.00 ; 18.20]	1.39	<0.05
Squats in 20 s, repetitions	A	14.2±1.43	16.4±1.25	+2.2	[-2.89 ; 7.29]	0.54	>0.05
	B	13.6±0.57	17.0±0.79	+3.4	[0.70 ; 6.10]	1.57	<0.05
Vertical jump, cm	A	28.4±1.20	29.2±0.82	+0.8	[-3.65 ; 5.25]	0.22	>0.05
	B	22.2±1.34	23.6±1.25	+1.4	[-3.46 ; 6.26]	0.36	>0.05
Push-ups in 20 s, repetitions	A	7.2±0.74	8.0±0.79	+0.8	[-2.37 ; 3.97]	0.31	>0.05
	B	7.0±1.12	10.0±0.79	+3.0	[-0.79 ; 6.79]	0.98	<0.10
Single-leg squats (right), repetitions	A	3.4±0.76	3.8±0.65	+0.4	[-2.38 ; 3.18]	0.18	>0.05
	B	1.8±0.42	2.6±0.27	+0.8	[-0.59 ; 2.19]	0.72	>0.05
Single-leg squats (left), repetitions	A	4.0±0.35	4.6±0.27	+0.6	[-0.68 ; 1.88]	0.58	>0.05
	B	2.8±0.22	3.4±0.27	+0.6	[-0.38 ; 1.58]	0.76	>0.05
Sit-ups, repetitions	A	14.0±0.35	18.0±0.79	+4.0	[1.58 ; 6.42]	2.06	<0.01
	B	11.0±0.79	12.0±0.71	+1.0	[-2.08 ; 4.08]	0.40	>0.05

Note. Δ – mean difference (Post–Baseline); d – Cohen's d for dependent samples; CI – 95% confidence interval; n=5 per subgroup.

significant improvements were observed in leg press, standing long jump, deadlift hold, and sit-up performance, with the greatest absolute gain recorded in trunk muscle endurance ( $\Delta = +4.0$  repetitions,  $p < 0.01$ ).

In Group B, significant improvements were identified in plank, leg press, standing long jump, deadlift hold, and squats in 20 seconds. The largest absolute increases in this subgroup were observed in lower-body strength measures, particularly leg press ( $\Delta = +14.0$  kg,  $p < 0.01$ ) and standing long jump ( $\Delta = +17.0$  cm,  $p < 0.05$ ).

Between-group comparison of absolute changes suggests that Group B tended to demonstrate greater gains in lower-body strength parameters, whereas Group A showed relatively more pronounced improvement in trunk muscle endurance. However, these differences should be interpreted descriptively, as no direct statistical comparison between groups was performed.

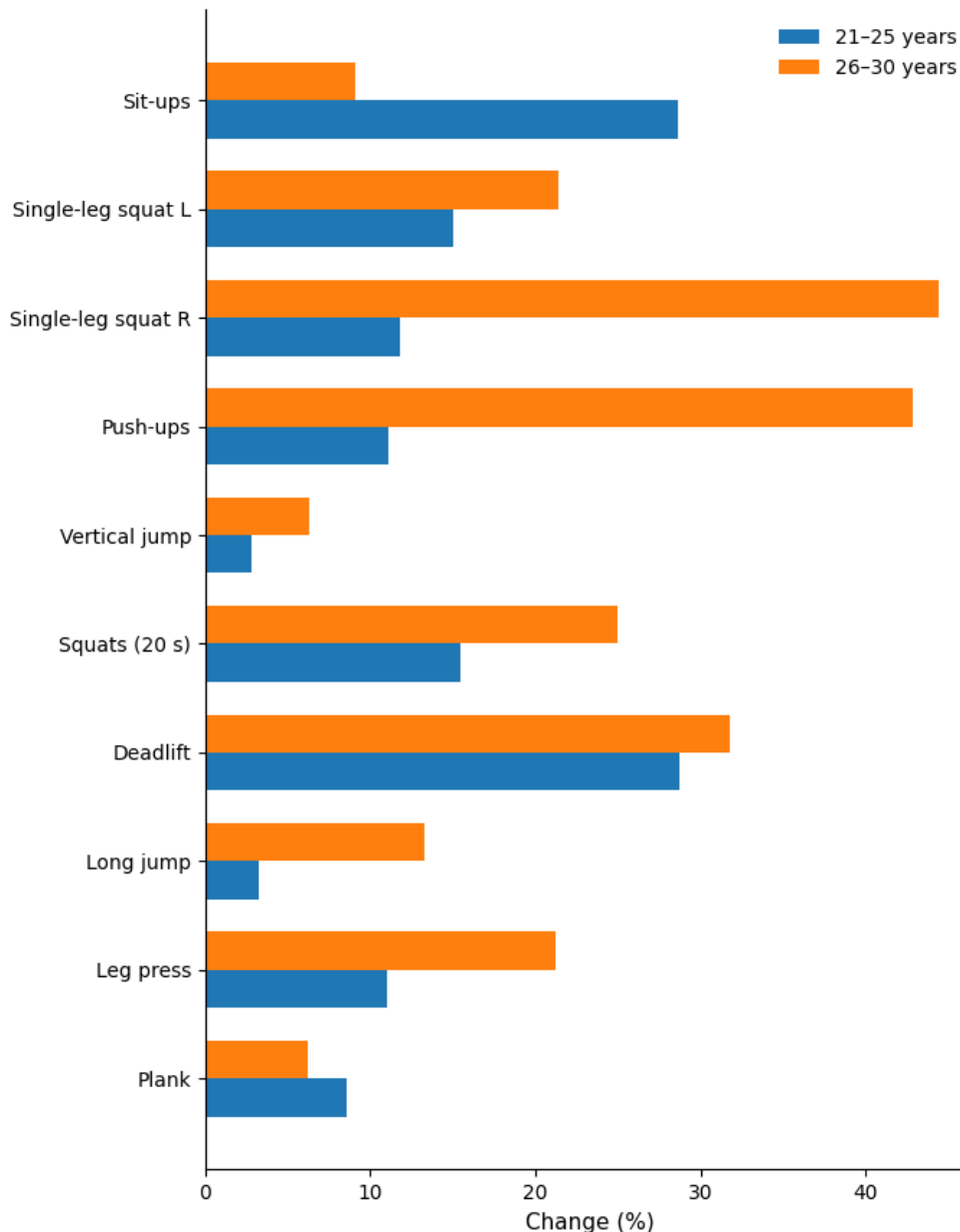
Percentage changes are presented in Figure 1. Greater relative improvements in lower-body strength were observed in the 26–30-year subgroup, whereas larger gains in trunk endurance were noted in the younger subgroup. Between-group

differences should be interpreted cautiously due to the small sample size.

## Discussion

The aim of the study was to assess changes in strength fitness indicators in women of early mature age under the influence of individualized fitness programs in a war-affected environment. The obtained results demonstrated positive dynamics in the majority of the assessed indicators in both age subgroups following the five-month experimental intervention. In women aged 21–25 years, statistically significant improvements were observed in the leg press, standing long jump, deadlift hold, and sit-up tests. In the 26–30-year-old subgroup, significant changes were recorded in the plank, leg press, standing long jump, deadlift hold, and squats in 20 seconds tests. These findings indicate the effectiveness of individually tailored strength-oriented programs in improving strength preparedness in women of early mature age, even under conditions of prolonged war-related environmental stress.

The statistically significant changes observed in strength fitness indicators in both age subgroups



**Figure 1.** Percentage Changes in Strength Indicators in Women Aged 21–25 and 26–30 Years Following the Intervention

may be explained by a complex of neuromuscular adaptations resulting from the systematic performance of resistance exercises. During the initial stages of the training process, primary mechanisms include improvements in intermuscular coordination, enhanced motor unit recruitment efficiency, and optimization of neuromuscular interaction, which contribute to increases in strength performance without substantial morphological alterations. These mechanisms likely account for the statistically significant improvements observed in the leg press, deadlift hold, and standing long jump tests.

An important factor contributing to the positive dynamics was the individualization of training loads. The adaptation of training programs to participants'

age-related characteristics, baseline fitness levels, and functional status ensured optimal regulation of exercise volume and intensity, thereby enhancing training effectiveness. An individualized approach may also have minimized the risk of overload under conditions of elevated psycho-emotional stress characteristic of a war-affected environment.

Comparison between age subgroups revealed certain differences in the structure of adaptations. In women aged 21–25 years, more pronounced improvements were observed in indicators related to dynamic strength and trunk muscle endurance, whereas in the 26–30-year-old subgroup, significant changes were also noted in tests reflecting static endurance and speed-strength capacity. These differences may be associated with variations in

baseline functional status and adaptive potential among participants.

At the same time, some indicators did not reach statistical significance, including vertical jump, single-leg squats, and certain measures of strength endurance. Such findings may be attributed to the small sample size, interindividual variability in response to training stimuli, and external factors related to the war-affected environment that could have influenced training consistency and recovery processes.

Overall, the obtained data indicate the presence of strength-related adaptive changes resulting from the implementation of individualized fitness programs, supporting the feasibility of personalized training approaches for women of early mature age even under challenging social and environmental conditions.

The obtained results are consistent with recent national studies emphasizing the effectiveness of individualized physical training programs for women of different age groups. In particular, Voichun et al. [9] and Kovalova et al. [10] substantiated the feasibility of a variable approach to designing strength programs that takes into account age-related and functional characteristics, which corresponds to the positive dynamics observed in leg press performance and strength endurance in the present study. Similar trends in the improvement of speed-strength qualities have also been reported by Golenkova and Isichko [11], who highlight the importance of integrating traditional resistance exercises with functional training elements.

The findings of the present study also extend the results of our earlier work [27], in which individualized fitness sessions were shown to improve strength preparedness in women of early mature age. Unlike the previous investigation, the current study incorporates a structured comparison with international research data and includes analysis of absolute changes ( $\Delta$ ), allowing for a more detailed evaluation of the magnitude and structure of strength adaptations. This methodological expansion enhances the interpretative depth of the results obtained under prolonged war-related conditions.

The results obtained in the subgroup of women aged 26–30 years are also in agreement with the findings of Byshevets et al. [21] and Potop et al. [22], who reported an association between regular physical activity and stabilization of psychophysical status under war-related environmental conditions. The positive changes identified in static endurance and strength performance indicators may therefore be interpreted as manifestations of adaptive mechanisms supporting functional stability under increased stress exposure.

Other studies suggest that individualized load prescription contributes to greater improvements in strength performance among adults, particularly in

high-stress or adverse psychosocial environments. Findings reported by Yuan et al. [15] and Filippou et al. [16] demonstrate the compensatory role of regular physical activity in improving psycho-emotional status among individuals exposed to adverse social circumstances, indirectly supporting the results of the present study.

Similar conclusions are also supported by contemporary meta-analyses and experimental investigations demonstrating the effectiveness of resistance training in adult populations regardless of baseline fitness level. Peterson et al. [28] confirmed that progressive resistance exercise produces consistent gains in muscular strength among young and middle-aged women. Ralston et al. [28], in a systematic review, reported that training frequency is less influential on strength gains than appropriate load prescription and progression. Moreover, Steele et al. [30] emphasized the importance of individualized intensity selection and workload control to achieve stable adaptive responses. In the context of psycho-emotional stress, the findings of Gerber et al. [31] indicate that resistance exercise exerts beneficial effects on stress regulation and psychophysiological resilience. Collectively, these findings support the premise that individualized strength training can induce adaptive effects even in the presence of external stress-related factors.

At the same time, several indicators in the present study did not reach statistical significance, which partially differs from findings reported in some international studies demonstrating more pronounced improvements in speed-strength characteristics. This discrepancy may be attributed to the small sample size, the specific conditions under which the experiment was conducted, and the influence of the war-affected environment on the stability of the training process.

Overall, the obtained results generally confirm current trends regarding the effectiveness of individualized strength-oriented programs, while also reflecting the specific adaptive characteristics of women of early mature age living under prolonged war-related environmental conditions.

The present findings suggest that individualized resistance training may function not only as a physiological stimulus but also as a stabilizing behavioral intervention under crisis exposure. In this sense, strength-oriented fitness programs may serve as a dual-purpose strategy supporting both functional capacity and adaptive resilience in war-affected populations.

The war-affected environment functions as a complex contextual stressor capable of modifying the course of adaptive processes in the human body. Contemporary studies conducted among the Ukrainian population under conditions of armed conflict report decreased levels of physical activity, transformations in motivational attitudes toward

exercise, and increased psycho-emotional strain [18, 19, 20]. Such changes create additional constraints for training consistency and may influence the rate of strength-related adaptations.

Despite these constraints, participants maintained regular engagement in structured training throughout the intervention period. This sustained participation may reflect not only physiological adaptation but also behavioral resilience and a deliberate effort to preserve physical and psychological stability under prolonged crisis exposure.

The role of chronic stress as a factor influencing functional status and adaptive capacity is supported by findings reported by Byshevets et al. [21] and Potop et al. [22], who identified associations between physical activity levels and stress-related conditions. Investigations of autonomic nervous system functioning in students residing in war-affected regions further indicate the presence of adaptive changes associated with increased psycho-emotional load [23]. In the international context, the compensatory effects of physical activity on psycho-emotional status in individuals exposed to adverse social conditions have been confirmed by Bryant et al. [14] and Yuan et al. [15].

Within a broader scientific framework, the impact of chronic stress on physiological adaptation is viewed as a multifactorial process involving alterations in neuroendocrine regulation, heart rate variability, and muscle activation patterns. McEwen [32] introduced the concept of allostatic load, suggesting that prolonged stress may alter adaptive capacity and influence training effectiveness. Large-scale epidemiological studies also demonstrate associations between physical activity levels and mental well-being in general populations [33]. Furthermore, Gerber et al. [34] reported that regular exercise plays a compensatory role in stress regulation and contributes to enhanced psychophysiological resilience, while Stubbs et al. [35] highlighted the beneficial effects of physical activity in reducing anxiety and stress symptoms among adults. Collectively, these findings support the interpretation of individualized strength-oriented programs as a potential mechanism for maintaining adaptive stability in women exposed to prolonged war-related stress.

At the same time, the results of the present study demonstrate the preservation of positive dynamics in strength indicators despite war-related environmental constraints. This may indicate sufficient adaptive potential in women of early mature age and the effectiveness of individualized load prescription in maintaining functional stability under chronic stress exposure. Therefore, the war-affected environment not only complicates the organization of the training process but also acts as a modifying factor that must be considered in the

planning and adjustment of individualized fitness programs.

#### *Practical Significance of the Obtained Results*

The findings of the present study have practical relevance for specialists in fitness and physical culture, as they confirm the effectiveness of individualized strength-oriented programs for women of early mature age even under war-related environmental conditions. For coaches, these results indicate the importance of adapting training volume and intensity according to individual functional capacities, baseline fitness levels, and psycho-emotional status of clients. The practice of gradual load progression and exercise variability allows for positive dynamics in strength indicators while minimizing the risk of overload.

For the fitness industry, the study underscores the relevance of implementing personalized training programs, particularly in regions characterized by social instability. Organizing sessions with flexible scheduling, utilizing accessible equipment, and allowing adjustments in load parameters according to current circumstances contribute to maintaining population-level physical activity in crisis environments.

When working with women of early mature age, it is essential to combine resistance exercises with means aimed at developing general endurance and stabilization capacity in order to support functional condition and psychophysical resilience. The results demonstrate that even under conditions of elevated stress exposure, individually prescribed training programs can promote strength gains and sustain adaptive potential.

Thus, the practical value of the study lies in the applicability of the proposed approaches to organizing individualized fitness sessions as an effective tool for maintaining physical performance in women of early mature age within crisis-affected environments.

#### *Limitations of the Study*

Despite the positive results obtained, the study has several limitations that should be considered when interpreting the findings. First, the small sample size ( $n = 10$ ), due to specifics of war-affected environmental conditions and limited opportunities to recruit a larger number of participants for a prolonged intervention, restricts the generalizability of the results to a broader population of women of early mature age. The absence of a non-training control group also limits causal interpretation of the observed changes.

Furthermore, the study was conducted within a single fitness club and in a specific region of Ukraine affected by military actions, which may also influence the representativeness of the findings. Psycho-emotional and social factors characteristic of wartime conditions may have affected participants

differently, contributing to variability in individual responses.

Another limitation concerns the duration of the experimental period, which allowed for the assessment of short- and medium-term adaptive changes but did not enable evaluation of the long-term effects of individualized fitness programs. Additionally, the study did not include an in-depth assessment of psycho-emotional indicators, which could have provided a more comprehensive understanding of the influence of the war-affected environment on training outcomes.

#### *Future Research Directions*

Future research should focus on expanding the sample size and involving participants from different regions of Ukraine to enhance the representativeness of the findings. Long-term longitudinal studies are warranted to assess the stability of strength-related adaptations under prolonged war-related environmental conditions.

Further investigations may include the assessment of psycho-emotional status, heart rate variability, anxiety levels, and other markers of adaptive capacity in order to provide a comprehensive evaluation of the effects of individualized fitness programs on both physical and psychophysiological well-being in women of early mature age. Comparative analyses of different models of load individualization, taking into account the intensity of war-related environmental exposure and specific training organization factors, also represent a promising direction for future research.

Thus, continued exploration of strength development under crisis conditions may contribute to the refinement of methodological approaches to individualized physical training and enhance their overall effectiveness.

## Conclusions

1. The conducted study demonstrated the practical feasibility of implementing individualized strength-oriented fitness programs for women of early mature age under war-affected environmental conditions.
2. Over the course of the five-month intervention, positive dynamics were observed in the majority of strength fitness indicators in both age subgroups (21–25 and 26–30 years), demonstrating the effectiveness of individually prescribed training loads.
3. The most pronounced improvements were recorded in dynamic strength and strength endurance indicators, particularly in the leg press, deadlift hold, standing long jump, and sit-up tests, confirming the development of neuromuscular adaptations in response to systematic training.
4. The war-affected environment acts as a modifying factor influencing the organization of the training process and adaptive capacity; however, it does not prevent positive outcomes when training programs are properly individualized.
5. The obtained findings may be applied in the practical work of coaches and fitness professionals for the development of safe and effective strength training programs for women of early mature age in crisis-affected environments.

## Conflict of interests

The authors declare that there is no conflict of interests.

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