Effects of Physical Activity and Counselling Interventions on Health Outcomes among Working Women in Shanghai

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Abstract

Background　Working women in Shanghai are a special group with a high risk of suffering work stress and burnout. They were disturbed by the work-family conflicts, which results in lower health-related quality of life (HRQoL), higher job stress and burnout. This study evaluated the potential physical activity and counselling intervention effects on health outcomes of working women in Shanghai participating in a group- or an individual-based physical activity and counselling intervention compared to a control group. Methods　Participants were randomly recruited from eight communities of Shanghai using the stratified cluster sampling method. A sample of 121 female workers was used in this study. They are randomly divided into three groups: a control group and two intervention groups (individual-based and group-based intervention). The two intervention groups accepted 12-week moderate physical activity and counselling intervention. Subjective perceptions of work stress, burnout, and HRQoL were measured before and after the intervention. Results　In the control group, no significant difference was found between participants for stress (p = 0.752) and burnout (p = 0.622) before and after the experiment. However, the HRQoL value decreased after the experiment, with the mean value falling from 91.59 to 87.10. After the experiment, the value of stress and burnout decreased, and the value of HRQoL increased in the two intervention groups. At the intervention's completion, there were significant differences compared the two intervention groups to the control group separately regarding changes in burnout and HRQoL (all p = 0.000). For stress, the group-based intervention group exhibited a significant difference compared to the control group (p = 0.000), while the individual-based intervention group did not exhibit a significant difference compared to the control group (p = 0.128). Conclusion: Physical activity and counselling intervention delivered either in a group or individual format could reduce stress, burnout, and improve HRQoL of working women in Shanghai, and the group interventions were more effective than those targeted at individuals.

Background

As one of the most modern and industrialized cities in China, Shanghai has exhibited rapid economic development and become China's leading financial center in the past decades [1]. Due to the fast socio-economical development and continuous improvement of women's status, significant changes and positive transformations have occurred in the daily lives of the city residents, especially for women. Feminine self-consciousness starts to awaken and to strengthen unceasingly, more and more women are not confined to the family, but enter into the social workplace to realize their own life value. Meanwhile, the life pace in Shanghai is accelerating, and people are increasingly immigrating to Shanghai to work, which makes the working environment more competitive, and increasingly exposes workers to job strain, stress, and burnout [2]. Working women in Shanghai represent a special demographic group with a large, increasing population. They bear both work and family responsibilities. In the workplace, they must work hard to realize their value in life and at the same time play a good wife and loving mother role in family life [3]. Under the double influence between the traditional gender concept of "male advocate outside, female advocate inside" and the modern social and family labor division of "men's and women's

equality", women play a dual role (home and work) in the society. While women's participation is increasing in economic life, their payment on home affairs is not reduced accordingly [4]. The workplace life and family life are much different, which make it easy for working women to have family and work conflicts [3]. This so-called "second shift" phenomenon places significant demands on working women's time. The necessity to fulfill multiple roles makes work-family conflicts virtually inevitable, which often results in job dissatisfaction, job strain, and increased stress [5].

Researchers have demonstrated that working women with both work and family obligations report higher levels of physical and psychological stress than male employees. Such stress results from high expectations coupled with insufficient time, skills, and social support [5]. As a consequence, working women must spend more time and energy on arduous and stressful work to keep pace with the city's development [6]. Stress is a physical and/or mental reaction that occurs when the external environment or working conditions are perceived to be uncontrollable and threatening [7]. It can occur because of the type of occupation, one's status and position within the occupation, gender composition within the occupation and gender differences in interpreting stress [8]. Besides, women have low tolerance, strong hesitation and are more likely to have stress problems in work [9]. Stress can inspire certain individuals, however, excessive stress has a severe impact on women's working performance and has been related to various negative mental and physical health outcomes, such as increased stress, job burnout [10]. Prolonged stress can contribute to employment absenteeism, increased health expenses, and ultimately reduced work effectiveness and income [11]. In recent years, burnout has come to be regarded as a common work-related phenomenon. The most widely accepted definition of burnout is that of Maslach and Jackson: "a psychological syndrome of emotional exhaustion, depersonalization, and reduced accomplishment that can occur among individuals who work with other people in some capacity" [12]. Different from job stress, burnout exhibits a multidimensional symptomatology, which is partly related to a high initial level of motivation, and primarily results from a breakdown in adapting to prolonged stress [13]. Studies have demonstrated that high work demands, job strain, and lack of social support at work are the main psychosocial contributors to burnout [14], and high job demand and low levels of control have been associated with high levels of burnout in women [15]. How to perform and harmonize both duties well has been a heavy burden for working women.

Physical activity and exercise behavior play an important role in improving an individual's perception of health-related quality of life (HRQoL) [16]. HRQoL is a multidimensional concept that includes the individual's physical health, psychological state, social relationships, and environment [17]. Studies have demonstrated that physical activity can contribute to alleviating negative health-related outcomes, which could significantly improve the quality of life of working mothers [18]. Further research showed that higher levels of leisure time physical activity (LTPA) were significantly related to higher levels of HRQoL in both men and women [19]. Besides, exercise can result in increased functional capacity, improved mood, increased self-esteem, better adjustment to illness, decreased distress, improved body image, decreased fatigue and emotional distress, and reduced depression and anxiety [20]. Naumann et al. proved this with their experiment, in which all healthy participants achieved significant improvements in physical and psychological HRQoL domains relative to no-exercise controls, and a moderate positive effect of exercise

interventions was found for overall HRQoL in participants [21]. Apart from exercise intervention, multilevel intervention also displayed significant improvements in depressive symptoms and social support [22].

As of 2013, there were 7.52 million female workers in Shanghai [23]. Although several intervention studies have been performed on female populations, most of them primarily focused on outpatients or individuals with certain chronic diseases [24, 25]. Only a limited number of intervention studies have focused on working mothers [26, 27]. In addition, according to the Ternary Interactive Determinism of Social Cognitive Theory, behavior, human internal factors (such as cognitive factors, emotional factors) and the environment are interrelated and mutually determined [28]. Participants' internal factors such as emotion and cognition will also affect their behavior except for the external environment. That's what inspired the setting of physical activity intervention combining with counselling. Most studies have only addressed single health outcomes, such as HRQoL, depression or physical performance. Few studies have investigated the impact of physical activity and counselling interventions on working women's health outcomes (e.g., stress, burnout, and quality of life), particularly in a specific city, such as Shanghai. Therefore, the primary purpose of this study is to investigate the effect of a physical activity and counselling intervention on health outcomes of working women in Shanghai with data collected at baseline and 12-week follow-up assessments. This study evaluated the potential of a physical activity and counselling intervention to decrease work-related stress and burnout and improve health-related quality of life of working women participating in a group- or individual-based physical activity and counselling intervention compared to controls.

Method

Participants

Participants were working women randomly recruited from eight communities in Shanghai China using the stratified cluster sampling method. Participants were either friend-referrals or self-referrals based on advertisement and recruitment events in communities. They were gathered in the Sports Health Service Center of Shanghai University of Sport for screening. The sampling inclusion criteria were: aged 25 to 60 years, Shanghai residents, not retired, without joint or muscular abnormalities, and having the ability to participate in exercise and complete the health outcomes questionnaires. A total of 70 participants were needed for this study to reach a power of 80% at an alpha level of .05 based on a statistical power analysis to detect an effect size of ES = 0.25 [29].

A total of 225 individuals initially displayed interest in participating in the study. Of them, 135 completed the baseline measures and were randomized into three groups: group-based intervention group (Exp_G, n = 46), individual-based intervention group (Exp_I, n = 44), and control group (Ctrl, n = 45). The participants in Exp_G were randomly allocated with each group of 6-8 women. Of the 135 randomized participants, an additional 14 participants were lost at the 12-week follow-up. Five participants dropped out from lack of interest, and four dropped out because of schedule/time conflicts. In addition, five cited family/personal issues that prevented continuing participation. Finally, 121 working women who met the inclusion criteria

were enrolled in the study and completed the pre- and post-measures (Fig. 1). This study obtained the approval of the ethics committee in Shanghai University of Sport. All participants signed consent forms before they joined the study and were provided a full explanation regarding the purpose and potential benefits/risks of the study, confidentiality, and their right to withdraw from the study.

Measures

Demographic variables

To characterize the participants in this study, self-reported personal information on age, and race were obtained using questionnaires.

Stress

The Chinese version of the Psychosomatic Tension and Relaxation Inventory (PSTRI) was used to measure stress [30]. This inventory consists of 50 items rated on a Likert scale from 1 (never) to 5 (always). The total score on the 50 items was used to measure the level of perceived stress. Higher PSTRI scores indicated higher levels of stress. In this study, the Cronbach's alpha of this scale was .95.

Burnout

Job burnout was measured by the 15-item Maslach Burnout Inventory-General Survey (MBI-GS) developed by Maslach and Jackson [12]. The survey consists of three dimensions: emotional exhaustion (5 items), professional efficacy (6 items), and cynicism (4 items). All the items were rated on a Likert scale from 1 (never) to 7 (every day). Lower scores on the dimension of professional efficacy and higher scores on the dimensions of cynicism and emotional exhaustion denoted higher levels of job burnout. The Chinese version of the MBI-GS was translated back into English to test language validity. The Chinese MBI-GS has been found to exhibit good reliability and validity and has been widely used in Chinese populations [31]. In this study, the Cronbach's alpha coefficient for the total scale was .71. The Cronbach's alpha coefficients of emotional exhaustion, cynicism, and professional efficacy were .86, .79, and .90, respectively.

HRQoL

HRQoL was measured by the Chinese version of the Quality of Life Scale-Brief [17], which was modified from WHOQOL-100 and translated into Chinese. The scale consists of 26 items and includes four dimensions: physical health, social relationships, psychological status, and environment. Each item is rated on a five-point Likert scale (1 = very dissatisfied; 5 = very satisfied). Item scores for each dimension were coded/recoded and summed to obtain the total HRQoL score, with a higher total score indicating a better quality of life. In this study, the Cronbach's alpha coefficients of physical health, psychological, social relationships, and environment were .76, .72, .75, and .79, respectively.

Procedure

The participants who signed the consent form were directed to the Sports Health Service Center of Shanghai University of Sport to complete the physical fitness tests and baseline self-reported questionnaires on work stress, burnout, and HRQoL. All the devices for physical fitness tests were from TKK Company of Japan, except for the device for Bone Mineral Density test, which was from GE Express of USA. Subsequently, the participants were randomly assigned to one of three groups: group-based intervention (n = 41), individual-based intervention (n = 40), or waitlist control (n = 40). Randomization was completed by an independent investigator who was not involved in data collection or intervention delivery. For all groups, follow-up data were collected in the same manner as the baseline data immediately after the three-month intervention. During the 12-week study duration, the control group did not receive any specific instructions relative to physical activity (i.e., they were free to continue their regular routines and exercise if they wished). This study was approved by the study venues.

Intervention

Exercise interventions (such as running, biking, walking, and dancing) have been effective in improving physical functioning, reducing stress and burnout. Meanwhile, it can improve physical and psychological well-being [32]. In our study, there are four intervention-related variables: intervention type, intervention frequency (i.e., times per week), the number of weeks, and the hours per session. The latter 3 variables can be considered as indexes of the intensity of the intervention. According to the Social Cognitive Theory, individual is able to manage and control his or her life rather than passively accepting or changing themselves to adapt to the environment. However, the group and social combination effect that seems more important than the individual function has always been emphasized in the field of health promotion [33, 34]. In addition, a study indicated that the group exercise format may offer participants additional benefits through greater social support, greater group cohesion, and comradeship by sharing the same physical and psychological challenges while there were also other references that had shown the opposite opinion, which insisted that individual intervention was more effective [21]. Therefore, two different exercise interventions were involved: (1) a group-based intervention delivered in a group format and (2) an individual-based intervention delivered in an individual format. If combined with physical activity intervention, counselling intervention may generate more obvious effects. The entire 12-week moderate physical activity and counselling intervention was conducted three times per week for 45 to 60 min per session for participants enrolled in group or individual exercise programs. The study investigated the effectiveness of a 12-week physical activity and counselling intervention (group or individual) on the health outcomes of stress, burnout, and HRQoL of working women in Shanghai. We hypothesized that both group-based and individual-based physical activity and counselling interventions could decrease work-related stress and burnout and improve health-related quality of life among the women compared to a control group and that a group-based physical activity and counselling intervention could achieve additional benefits in social well-being as opposed to individual exercising.

The intensity of the individual exercise intervention group was three times per week for 45-60 min per session. The goal for each participant was 150 min of physical activity per week with moderate intensity. Each exercise program was individualized according to baseline health, fitness levels, and personal goals.

Three parts were included in the individual exercise program: warm-up, cardiovascular training (cycling, cross-training, brisk walking), and a cool-down period. The group exercise cohort also exercised three times per week for 45–60 min per session, with a similar target goal of 150 min per week of moderate intensity physical activity. The group exercise program also consisted of three parts: warm-up, cardiovascular training (cycling, cross-training, brisk walking), and a cool-down period. Although they participated in same exercise activities, group-based intervention group held team-focused activities, such as competitions among different groups or tasks that needed to be done together, thereby helping to foster team cohesion. All exercises were led by the same accredited exercise instructors.

The principle of counselling intervention was client-centered, which means all the activity launched was based on the needs of each participant. Facilitating disclosure of feelings and anxieties, clarifying issues and providing reassurance and support for the women as required were the duty of the counsellor. The individual and group counselling interventions were both conducted once a week for one hour, and the group counselling intervention was in groups of six to eight women. General themes covered were the following: work-family conflicts, stress, burnout, anxiety, self-efficacy, and health-related quality of life. The counselling happened at the end of the third exercise intervention every week. In the study period of 12 weeks, there was no specific exercise or counselling that participants in the control group need to engage in.

Data Analysis

The data were analyzed using Statistical Product and Service Solutions (SPSS 22.0, SPSS Inc.) software. Descriptive statistics were calculated for all variables. Data normality was verified by using the Kolmogorov-Smirnov test. Multivariate analysis of variance (MANOVA) with repeated measures was performed between different groups to examine differences at baseline and after the 12-week intervention. To account for multiple testing, Bonferroni corrections, with adjusted CIs, was performed to investigate the differences between groups. An alpha level of .05 was used to determine statistical significance. Effect sizes (ESs) were calculated utilizing the mean and standard deviation (.2 or less is a small ES; approximately .5 is a moderate ES; .8 or more is a large ES) [35].

Results

No significant difference was found between groups for demographic characteristics, body fat rate, sitting stretch, reaction time, VO2Max, Bone Mineral Density, and BMI (Table 1). There were no adverse reactions to participation in the exercise or counselling intervention.

Table 1 Descriptive statistics

Variables	Exp_G（N=41）	Exp_I（N=40）	Ctrl（N=40）	p-value
	M ± SD	M ± SD	M ± SD	
Age	44.02±7.41	42.87±6.82	43.53±8.41	0.364
Height (cm)	160.12±4.76	158.86±4.72	159.72±5.33	0.505
Weight (kg)	61.18±9.10	55.76±6.36	58.87±8.96	0.231
Body Fat Rate	34.57±5.40	30.32±5.36	31.24±6.86	0.162
Sitting Stretch (cm)	11.34±7.20	12.98±7.01	9.38±10.01	0.118
Reaction Time (sec)	.434±0.073	.419±0.554	.442±0.633	0.136
VO_2Max	26.23±5.40	29.92±4.65	27.12±4.27	0.738
Bone Mineral Density	-.573±1.07	-.405±1.11	-.558±0.95	0.173
BMI	23.85±3.29	22.09±2.29	23.098±3.50	0.395

Notes. M = mean; SD = standard deviation; Exp_G = group-based intervention group; Exp_I = individual-based intervention group; Ctrl = control group.

To compare the impact of exercise and counselling intervention on health outcomes between different groups at baseline and at the post-intervention time point, a MANOVA with repeated measures was performed. As the p-value of Mauchly's Test of Sphericity was less than 0.05, the Multivariate Tests results were used to examine the difference between groups. In this study, the effect of Pillai's trace was chosen to reveal the significance of the main effects of 'time' and 'group' and the interaction effect 'time x group'. The multivariate tests results were shown in Table 2.

Table 2 Multivariate Tests Results

Variables	Effect value(Pillai's Trace)			F value			p-value		
	Time	Group	Time x Group	Time	Group	Time x Group	Time	Group	Time x Group
Stress	.022	.119	.029	2.671	7.990	1.790	.105	.001**	.171
EE	.336	.085	.089	59.751	5.545	5.732	.000**	.005**	.004**
Cynicism	.066	.056	.174	8.393	3.486	12.397	.004**	.034*	.000**
PE	.173	.211	.247	24.665	15.792	19.303	.000**	.000**	.000**
Burnout	.279	.274	.205	45.639	22.289	15.204	.000**	.000**	.000**
PH	.077	.031	0.051	9.798	1.869	3.165	.002**	.159	0.046*
Psy	.009	.062	.107	1.060	3.872	7.036	.305	.024*	.001**
SR	.167	.023	0.96	23.709	1.365	6.238	.000**	.259	.003**
Env	.006	.224	.314	.682	17.055	27.051	.410	.000**	.000**
HRQoL	.009	.279	.298	1.039	22.816	25.063	.031	.000**	.000**

Notes. EE: emotional exhaustion, PE: professional efficacy, PH: physical health, Psy: psychological, SR: social relationships, Env: environment; ** *p*< .01, **p*< .05.

There are three effects, i.e. the main effect of 'time' and 'group' and a 'time x group' interaction effect. The 'time x group' interaction effects of all health outcomes were significant (all $p < 0.05$) except for stress (Pillai's Trace = 0.029; F (2, 118) = 1.790, $p = 0.171$ ($p > 0.05$), partial eta squared = 0.029) (Table 2). The main effects of 'time' for EE, Cynicism, PE, Burnout, PH, and SR were significant. The main effects of 'group' for all health outcomes were significant (all $p < 0.05$) except for PH and SR ($p =.159$ and $p =.259$, respectively).

Pairwise comparisons were conducted to compare the pre- and post-differences between different groups (Table 3). In the control group, no significant difference was found between participants for stress ($p = 0.752$) and burnout ($p = 0.622$) before and after the experiment. However, the HRQoL value significantly decreased after the experiment ($p < 0.01$), with the mean value falling from 91.59 to 87.10 (Table 3).

Table 3 Pairwise comparisons (pre and post) by group (N=121, 3 times of comparison)

Variables	Exp_G(N=41)			Exp_I(N=40)			Ctrl(N=40)		
	M±SD			M±SD			M±SD		
	Pre-	Post-	p-value	Pre-	Post-	p-value	Pre-	Post-	p-value
Stress	87.17±7.41	77.68±21.62	0.021*	91.40±18.96	87.88±15.59	0.363	93.30±23.95	94.73±9.51	0.752
EE	11.46±3.98	7.61±1.34	0.000**	11.75±3.31	8.35±1.54	0.000**	11.78±4.15	10.70±3.00	0.138
Cynicism	8.36±3.44	5.83±1.26	0.000**	8.78±3.92	6.85±1.87	0.004**	7.65±2.64	9.08±3.32	0.026*
PE	20.32±7.34	11.39±4.48	0.000**	18.28±7.54	13.53±3.27	0.000**	20.23±7.79	22.65±7.67	0.100
Burnout	37.19±10.66	24.83±4.63	0.000**	39.28±11.42	28.23±5.10	0.000**	41.30±12.21	42.43±11.21	0.622
PH	26.71±2.13	30.10±1.85	0.000**	27.7±2.68	28.95±1.84	0.039*	27.23±3.47	26.35±2.20	0.154
Psy	23.19±2.50	24.07±2.37	0.115	23.55±2.27	23.15±1.78	0.391	23.67±2.59	21.67±2.64	0.002**
SR	11.07±2.24	12.85±1.57	0.000**	10.75±1.59	11.10±1.22	0.213	11.55±1.45	11.45±1.75	0.740
Env	30.05±3.77	31.29±4.33	0.124	29.50±3.29	31.96±1.95	0.000**	29.50±4.05	27.63±4.02	0.006**
HRQoL	91.02±6.95	98.32±7.02	0.000**	91.50±7.47	95.13±3.67	0.018*	91.95±9.58	87.10±8.37	0.009**

After the experiment, the value of stress and burnout decreased, and the value of HRQoL increased in Exp_G and Exp_I (Table 3). At the completion of intervention, there were significant differences both in Exp_G and Exp_I regarding changes in burnout and HRQoL over time (Exp_G: $p < 0.01$◻ES = 0.601, $p < 0.01$◻ES = 0.463; Exp_I: $p < 0.01$, ES = 0.530, $p = 0.018$, ES = 0.295). After the entire 12-week moderate physical activity and counselling intervention, the individual-based intervention did not exhibit a significant difference for stress ($p = 0.363$), while the group-based intervention displayed a significant difference for stress ($p = 0.021$, ES = 0.282).

Pairwise comparisons were also performed to compare the differences between different groups at baseline (pre) and after (post) the 12-week intervention (Table 4). There were no significant differences between different groups for all the variables before the experiment (all p > 0.05) (Table 4). At the intervention's completion, there were significant differences compared intervention groups (Exp_G and Exp_I) to control group separately regarding changes in burnout and HRQoL over time (Exp_G vs. Ctrl: $p < 0.01$, $p < 0.01$; Exp_I vs. Ctrl: $p < 0.01$, $p < 0.01$). For stress, Exp_G exhibited a significant difference compared to Ctrl (Exp_G vs. Ctrl: $p < 0.01$), while Exp_I did not exhibit a significant difference compared to Ctrl (Exp_I vs. Ctrl: $p = 0.128$). Regarding the HRQoL subscales, social relationships (Exp_G vs. Exp_I: $p < 0.01$) exhibited a significant difference between the two intervention groups, with the group-based intervention improving significantly more than the individual-based group (Exp_G vs. Ctrl: $p < 0.01$, Exp_I vs. Ctrl: $p = 0.215$) (Table 4).

Table 4 Pairwise comparisons between three groups at baseline (pre-) and after the 12-week intervention (post-) (N=121)

Variables	Exp_G vs. Ctrl				Exp_I vs. Ctrl				Exp_G vs. Exp_I			
	p-value (Pre-)	ES (Pre-)	p-value (Post-)	ES (Post-)	p-value (Pre-)	ES (Pre-)	p-value (Post-)	ES (Post-)	p-value (Pre-)	ES (Pre-)	p-value (Post-)	ES (Post-)
Stress	0.275	0.170	0.000**	0.455	0.851	0.044	0.128	0.256	0.345	0.145	0.004**	0.261
EE	0.769	0.039	0.000**	0.554	0.809	0.004	0.000**	0.442	0.488	0.040	0.049*	0.248
Cynicism	0.444	0.115	0.000**	0.543	0.202	0.167	0.000**	0.382	0.707	0.057	0.012*	0.305
PE	0.708	0.006	0.000**	0.667	0.212	0.126	0.000**	0.612	0.065	0.136	0.030*	0.263
Burnout	0.163	0.176	0.000**	0.716	0.408	0.085	0.000**	0.632	0.452	0.094	0.003**	0.330
PH	0.450	0.090	0.000**	0.678	0.554	0.076	0.000**	0.540	0.095	0.200	0.014*	0.298
Psy	0.519	0.094	0.000**	0.432	0.786	0.025	0.004**	0.312	0.709	0.075	0.064	0.214
SR	0.325	0.126	0.000**	0.388	0.063	0.254	0.215	0.115	0.546	0.082	0.000**	0.528
Env	0.521	0.070	0.000**	0.401	0.816	0.000	0.000**	0.565	0.550	0.077	0.690	0.099
HRQoL	0.843	0.055	0.000**	0.588	0.817	0.026	0.000**	0.528	0.681	0.033	0.012*	0.274

Notes. EE: emotional exhaustion, PE: professional efficacy, PH: physical health, Psy: psychological, SR: social relationships, Env: environment; ** $p<$ .01, * $p<$ .05.

Discussion

As hypothesized, at the end of the 12-week intervention, significant differences in health outcomes were observed in both exercise groups except the stress value in the Exp_I. However, no significant difference was found in the control group except that the HRQoL value decreased, perhaps because the participants in the control group did not participate in scheduled exercise or counselling during the 12 weeks. Participants enrolled in a group or individual exercise program exhibited significant reductions in their total scores for stress and burnout. They also exhibited significant improvements in their total scores for health-related quality of life compared to no-exercise controls (Table 3). This finding is consistent with previous studies [13, 36]. Bettaieb et al (2015) found that physical activity could contribute to alleviating negative health-related outcomes and significantly improve health-related quality of life among working mothers [37]. The results from literature and this study suggest that regular physical activity is positively related to HRQoL outcomes and that physical activity and counselling (group or individual) interventions are effective for working women in Shanghai. Thus, programs to promote regular exercise should be developed and encouraged for these women to prevent stress, burnout and improve their health-related quality of life.

Anne-Marie Slaughter's essay "Why Women Still Cannot Have It All" emphasized the challenges faced by working mothers [38]. Bettaieb et al. put forward that social load, physical and mental workload significantly influenced the quality of life [37]. Pairwise comparisons performed in this study revealed that the group-based exercise intervention resulted in greater reductions in stress and burnout and greater improvements in HRQoL outcomes than the individual-based intervention (Table 3). Group exercise

format may offer additional benefits through greater social support, greater group cohesion, and comradeship between group members sharing the same physical and psychological challenges [38]. Combine with the result of Mailey's research that similar physical activity barriers and facilitators had expressed by working mothers and fathers, we think that future intervention may consider targeting mothers and fathers in tandem to make policy or offer welfare to them so as to reduce the heavy burden and increase physical activity of women [26].

Group cohesion has been defined as "a dynamic process reflected by the tendency of a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of members' collective needs" [39]. Better social well-being and health outcomes may be achieved by group-based exercise and counselling interventions rather than individual-based exercise and counselling interventions. In addition, Sushames and Jannique observed that the physical activity level was significantly associated with health-related quality of life [40]. This finding agreed with a study by Gottleib and Wachala, who found that group interventions had more positive effects on participant psychological well-being by improving nearly every HRQoL domain [41]. Therefore, working women were encouraged to participate in group activities, such as team or outdoor extending activities, and follow the physical instructors' advice. Only with professional guidance, can the more obvious intervention effects be obtained.

Social support is defined as those activities performed by an individual that aid another person in reaching a desired goal and can be classified into four types of support-related exercise behavior: instrumental support, informational support, emotional support, and appraisal support [42]. Social support can help to increase physical activity and can be provided at an individual level by family, friends, or others who furnish encouragement to strengthen an individual's motivation to be physically active. Participants who feel rejected and lonely and thus dissatisfied with their social support may have poor emotional health and a poor perception of HRQoL [43]. Meanwhile, the physical and mental components of the HRQoL were the important factors associated with work ability. Tavakoli-Fard et al.'s research found that work ability of a majority of women was moderate, which means that both physical and mental health of working women should be emphasized [44]. Health authorities and policy makers can use the findings mentioned above to develop and implement programs to promote women's engagement in health-promoting behaviors and thereby, improve their quality of life.

Increased cohesion may also result from the facilitated social support received when exercising with other participants with a similar health condition [45]. It has also been reported that factors such as sharing experiences with other participants and being encouraged to exercise in group-exercise programs are important in terms of increasing compliance and the psychological comfort of the exercisers [36]. Exercising in a group rather than individually can provide additional benefits, such as forming a collective identity with other group members, improving one's self-image by the reconceptualization of physical behavior, and motivating one to be physically active [32].

However, the findings of this study do not agree with the results of a study by Naumann et al. (2012), who observed that a group exercise intervention did not improve the social well-being score more than the individual exercise setting [21]. The lack of significant improvement in the social well-being domain in the group exercise intervention could be attributed to the fact that the design of a group exercise program may not have involved sufficient social interaction to create psychosocial improvements over and above those of the individual program. Thus, group intervention did not take full advantage of group dynamics. In this regard, one could recommend incorporating more social aspects during the group intervention, such as group exercise goals in which all participants contribute to achieving the final goal, to capitalizing on group dynamics and to avoiding training individual participants in isolation [46].

Limitations

This study suffered from several limitations. First, this is an intervention outcome study with a relatively small sample size, which limits the coverage of the findings. Second, all the health outcome measures were based on self-reports. Therefore, the participants may have over or underestimated their levels of work stress, burnout, and HRQoL. In addition, only completer analyses are presented. As data were not presented on women's jobs or education, it is unclear whether this intervention could be relevant for women working in, for example, professional or manual occupations. Third, the participants in this study were drawn from Shanghai, China's economic center. Therefore, the findings of this study cannot be generalized to working women in other Chinese cities because of the differences between these cities and Shanghai. Finally, because of the short-term intervention, we could only evaluate the intervention effects on health outcomes at the 12-week follow-up assessment. Therefore, a longitudinal study should be performed to determine whether physical activity and counselling intervention benefits are sustainable in the long term. Future studies could also be conducted on which exercise program, and of what intensity and duration, would be the most feasible and effective at improving the health outcomes of working women in Shanghai and other cities.

Conclusion

This study examined the effects of a 12-week physical activity and counselling intervention on health outcomes of working women in Shanghai. This study's findings revealed that a physical activity and counselling intervention delivered either in a group or individual format could reduce stress and burnout and improve health-related quality of life among the working women compared to controls. In addition, participants exhibited better benefits in the social well-being domain when exercising in groups rather than individually. Our findings suggest that interventions aimed to improve these women's perceived abilities to cope with stress from home and work, such as regular exercise and developing strong social support, are likely related to lower stress and burnout and higher HRQoL. Despite the study's limitations, several of our findings agree with previous studies, thus confirming our study's validity and encouraging us to believe that we may have provided a new perspective on the impacts of physical activity and counselling intervention on working women's health outcomes.

List Of Abbreviations

RCT: Randomized Controlled Trial

HRQoL: Healtth-related Quality of life

MANOVA: Multivariate Analysis of Variance

ES: Effect Size

LTPA: Leisure Time Physical Activity

MBI-GS: Maslach Burnout Inventory-General Survey

PSTRI: Psycho Somatic Tension and Relaxation Inventory

SPSS: Statistical Product and Service Solution

EE: Emotional Exhaustion

PE: Professional Efficacy

PH: Physical Health,

Psy: Psychological,

SR: Social Relationships,

Env: Environment;

Declarations

- **Ethics approval and consent to participate**

The ethics committee in Shanghai university of Sport approved this study. All participants signed consent forms before they joined the study and were provided a full explanation regarding the purpose and potential benefits/risks of the study, confidentiality, and their right to withdraw from the study.

- **Consent to publish**

Not applicable.

- **Availability of data and materials**

The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author who was an organizer of the study.

- **Competing interests**

The authors declare that they have no competing interests.

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- **Authors' contributions**

All of the authors (HYW, YX, XLR, PZ, MML, and TZ) contributed to the conception of the study, drafting and critical revision of the manuscript, and provided final approval of the manuscript.

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Figures
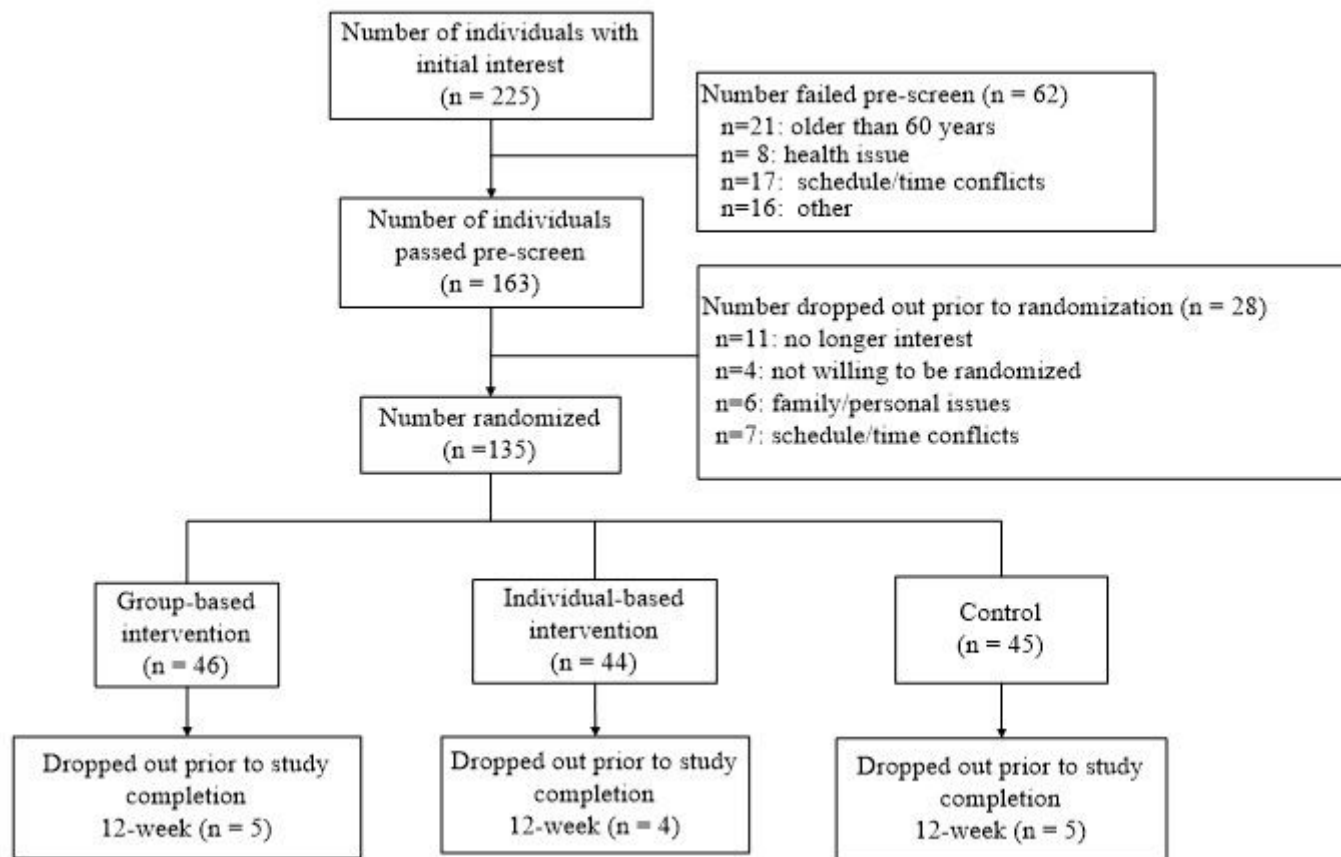
Figure 1

Participant flow through the study