ORIGINAL ARTICLE

Effects of a hospital-based leisure activities programme on nurses' stress, self-perceived anxiety and depression: A mixed methods study

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Abstract

Aims: To determine the effects of a hospital-based leisure activities programme on nurses' stress, self-perceived anxiety and depression.

Background: Nursing work in clinical settings is highly stressful and may result in an increase in nurses' turnover rate, which threatens the quality of nursing care and patient safety.

Methods: We used a mixed methods design and a three-month intervention (January to April, 2019) involving a convenience sample of 176 nurses working at a Chinese tertiary hospital. We conducted 12 semi-structured interviews and performed a content analysis. The pre- and post-intervention comparisons of nurses' stress, self-perceived anxiety and depression were performed using a paired t test.

Results: The 3-month leisure activities programme significantly decreased nurses' job stress ($t = 3.80$, $p < .01$), perceived personal stress ($t = 3.30$, $p < .01$), self-perceived anxiety ($t = 3.76$, $p < .01$) and depression ($t = 2.73$, $p < .01$). The qualitative findings revealed five mechanisms linking leisure activities to subjective well-being: detachment recovery, autonomy, mastery, meaning and affiliation.

Conclusions: A hospital-based leisure activities programme had a positive effect on job stress, self-perceived anxiety and depression, thus improving nurses' well-being.

Implications for Nursing Management: A hospital-based leisure activities programme provides a beneficial strategy for ameliorating nurses' psychosocial issues. Interventions aimed at facilitating or increasing nurses' participation in leisure activities are greatly needed.

KEYWORDS
anxiety, depression, job stress, leisure activities, nurse, perceived stress

1 | BACKGROUND

Considering the stressful working environment in hospitals, nurses often suffer from job stress and psychosocial problems (Wu et al., 2020). Job stress is defined as a feeling of dysfunction resulting from perceived conditions or happenings within the work setting (Parker & DeCotiis, 1983). Numerous studies show that most nurses may experience medium to high levels of job stress in different health care settings (Lo et al., 2018). Increased stress or continuous exposure to stressful working environments is often associated with psychosocial problems (e.g., anxiety and depression) or preventable work outcomes (e.g., absenteeism, turnover, job dissatisfaction and decreased productivity). These outcomes threaten the quality of nursing care, and therefore, patient safety (Chang et al., 2019; Liu et al., 2018).

Perceived personal stressors refer to stressful situations in one's life (Cohen et al., 1983). The high prevalence of job stress demands effective interventions to address perceived personal stress and associated psychosocial problems among nurses. Interventions to reduce stress, anxiety and depression among nurses may contribute towards building a healthy and productive workforce on the health care front-line (Chang et al., 2007), thereby providing safe direct nursing care for patients in need.

Participating in leisure activities is an interventional strategy that offers promising outcomes, such as quality of life, functional capacity, social network and subjective well-being (Iwasa & Yoshida, 2018; Lee et al., 2014). This is because of its nature of pleasant engagement in activities that are not part of one's job (Verghese et al., 2006) and its general association with happiness and physical health (Iwasaki, 2006). Existing research recognizes that leisure activities can alleviate stress and have a restorative impact on psychosocial wellness (Lee et al., 2020). The importance of its restorative value is related to enhanced joyfulness, physical vigour, social engagement and cognitive function, as well as to the reduction of emotional exhaustion and depression (Chiu et al., 2020).

Engagement in leisure activities is generally voluntary and motivated by intrinsic desires (Gallagher et al., 2012). Experience and perception of such activities are thought to intensify happiness and attenuate negative moods. However, evidence regarding leisure activities and its psychosocial benefits among nurses is scarce (Torquati et al., 2017). The ongoing COVID-19 pandemic greatly reduces opportunities and time for leisure activities among health care workers. Having less than 2 h available per day for leisure activities has been strongly linked to higher rates of anxiety and depressive symptoms among frontline health care workers (Hasan et al., 2020). Moreover, reduced engagement in leisure activities has been found to have a significant positive correlation with the severity of posttraumatic stress disorder (PTSD) symptoms among health care workers (Geng et al., 2021). As nurses represent the main workforce on the frontlines of health care, an investigation of the impact of leisure activities on nurses is warranted, to thereby reveal ways to improve their health during the prolonged COVID-19 pandemic.

Newman et al. (2014) argued that leisure engagement is linked to subjective well-being through psychological pathways; these pathways include detachment and recovery, autonomy, mastery, meaning and affiliation. Detachment from work can refresh individuals through the restorative power of leisure activities; autonomy—viewed as a requisite of leisure—refers to the perception of freedom offered by leisure activities; mastery reflects the sense of accomplishment by gaining skills or overcoming challenges, an important value gained from leisure activities; and lastly, social leisure activities often offer affiliation with others. The theoretical framework proposed by these five pathways underpins our investigation of the connection between leisure activities and psychosocial wellness within the context of nursing.

In the course of providing holistic care, nurses work with other relevant actors within or beyond their own domain. Peer support—particularly from those performing the same functions—is not only essential for teamwork; it is also highly valuable to one's psychosocial wellness (Guillaume & McMillan, 2002). Existing studies show an increase in nurses resorting to peer support to assist them in managing stressful conditions and promoting psychosocial wellness (Moloney et al., 2018; Webster et al., 2019). With this in mind, we consider the social dimension of taking part in leisure activities.

Taking part in leisure activities involves the activation of different communication channels; this multi-channelled communication may result in or amplify relaxing and joyful responses to leisure activities. When facing job stress, sharing experiences and subjective perceptions with peers could contribute to psychological resilience and improved psychosocial wellness outcomes (Agarwal et al., 2020). However, little evidence has been found of nurses' experience of leisure activities with their peers while coping with stressful conditions, such as those related to the COVID-19 pandemic.

This mixed methods study investigated the effects of a hospital-based leisure activities programme on the stress, anxiety and depression levels of frontline nurses in hospitals. We consider nurses' experiences and perceptions of such activity as contributory to a better understanding of the impact of the programme.

On the basis of the background provided, we hypothesize the following: A hospital-based leisure activities programme can significantly decrease nurses' job stress and perceived personal stress, which can, in turn, significantly decrease their self-perceived anxiety and depression and impact quality of care and patient safety.

2 | METHODS

2.1 | Design

This congruent mixed methods study (Creswell, 2018) was primarily quantitative, with a qualitative component. A pretest–posttest pre-experimental design was used to examine the effects of leisure activities on stress, anxiety and depression among nurses. The lack of a control group is due to the predicament of separating a group of nurses without exposing the organizational efforts made to ensure research fairness and avoid potential contamination (Duffy, 1985). Semi-structured qualitative interviews were conducted to explore individual participants' experiences of participating in the leisure activities programme to corroborate the quantitative findings.

2.2 | Participants

The study was conducted at a tertiary hospital with 2,419 open beds and 1,571 registered nurses, in the capital city of Eastern China. The nursing department designed and conducted the hospital-based leisure activities programme, and all nurses were encouraged to participate in the programme. The included participants were registered nurses aged 20 years or older who were employed permanently and registered as members for regular practice (e.g., at least once per week). The exclusion criteria were those who were receiving treatment for depression during the study period.

The sample size calculation estimated an effect size of 0.30 to detect small changes related to stress reduction at an alpha error rate of 0.05 and with 95% power, using the G*Power 3 program (Faul et al., 2007). Assuming a 20% follow-up loss, the calculation resulted in a final sample of 176. Convenience sampling was used to recruit participants through email invitations before the study. For the qualitative phase, purposive sampling was used to recruit participants from the roster of each leisure activity group. Sociodemographic characteristics (e.g., sex, marital status and years of clinical practice) were used as reference variables to identify potential participants for email contact during the qualitative phase. Recruitment was discontinued when data saturation was achieved (Morse, 2015).

2.3 | Intervention

Leisure activities were designed according to the guiding framework (Newman et al., 2014) to provide opportunities for distraction from work and to satisfy participants' experiences of autonomy, mastery, meaning and affiliation. Seven leisure activity groups were established, based on nurses' preferences. These were physical activities of dancing and Tai Chi and creative activities of calligraphy and painting, photography, flower arrangement, cooking and learning English. Approximately 1,000 registered nurses participated in the leisure activities. The activity plans differed among the different groups and consisted of theoretical learning and/or practice. The mean duration of leisure activity sessions was 40 min, and courses for every activity group were organized once per week (i.e., one session) in available multipurpose rooms, such as conference rooms, in the hospital. Nurses could participate in the facilitated 40-min sessions once a week for 12 weeks during the 3-month intervention period. Relevant information was published online for some groups, such as photography, cooking, flower arrangement and learning English. Participants were encouraged to engage in extra practice at home after participating in each session. Instructions and schedules for all types of leisure activities were published in newsletters to allow participants to make arrangements; nurses were allowed to choose one or more activities according to their personal interests and leisure time availability.

The different leisure activities were each presented by one professional staff member and two group facilitators. The professional staff member was responsible for teaching participants and recording their achievements. Group facilitators were responsible for assisting professional staff members in conducting leisure activities, identifying barriers to engaging in the programme, and facilitating communication among participants. The hospital provided minimal financial support and other in-kind types of support to facilitate the implementation of the activities.

2.4 | Measures

The participants' job stress was assessed using the job stress scale (JSS) developed by Li and Liu (2000). The scale has appropriate reliability and validity for assessing nurses' job stress in China. The JSS assesses professional and career issues (seven items), workload and time pressure (five items), resources and environmental problems (three items), patient care and interaction (11 items), and interpersonal relationships and management issues (nine items). Each item in the JSS is scored on a four-point Likert scale from 1 = *not at all* to 4 = *a lot*. Higher scores indicate higher job stress. The JSS had a Cronbach's alpha of .98 for Chinese nurses, and we obtained a Cronbach's alpha of .94 in this study.

The 14-item perceived stress scale (PSS) developed by Cohen et al. (1983) and translated into Chinese by Yang and Huang (2003) was used to assess the extent to which life situations can be considered stressful. The scale consists of two subscales—perceived coping and perceived distress—with seven items each. The response to each item was scored on a 5-point Likert scale from 0 = *never* to 4 = *very often*. A higher score indicates a high level of perceived stress. The Cronbach's alpha for the overall tool was .78, indicating good internal consistency. In this study, the Cronbach's alpha was .81.

The Chinese version (Wang, 1984) of the self-rating anxiety scale (SAS) was used to assess participants' anxiety-related symptoms (Zung, 1971). The SAS has 20 items, and each item is scored on a four-point Likert scale from 1 = *not at all or rarely* to 4 = *most of the time*. Higher scores reflected higher levels of anxiety. According to the SAS, a total index score of ≥50 indicates anxiety. The Chinese version of the SAS had a Cronbach's alpha of .85. In the present study, the Cronbach's alpha was .82.

The 20-item self-rating depression scale (SDS) developed by Zung et al. (1965) and translated into Chinese by Wang et al. (1999) was used to assess the participants' depression symptoms. Each item was scored on a four-point Likert scale from 1 = *not at all or rarely* to 4 = *most of the time*. The higher the index score, the higher the level of depression; depressive symptoms were determined with an index score ≥50. In the present study, the Cronbach's alpha was .85.

2.5 | Data collection

An online questionnaire containing questions about sociodemographic characteristics as well as the items from the aforementioned scales was created using a popular web-based survey system

(https://www.wjx.cn/). In early 2019 (January to April), the questionnaire was administered via email at baseline (before the study) and again after intervention (3 months later). Additionally, 12 participants were interviewed from April to May 2019, with the aid of a pre-designed interview guide. The interview questions were based on the type of leisure activities they participated in, the impact of these activities on their lives, and the factors that facilitated or impeded their participation. The principal investigator (a registered female nurse with a master's degree in nursing science and 9 years of clinical experience) initiated telephone interviews to determine participants' experience of participating in the hospital-based leisure activities programme. Interviews were audio recorded and discontinued when data saturation was achieved (Morse, 2015). The average interview time ranged from 30 to 40 min.

2.6 | Data analysis

The quantitative data were analysed using SPSS 21.0 for Windows (SPSS Inc., Chicago, IL, USA). Changes in nurses' job stress and perceived personal stress, anxiety and depression were compared using paired t tests. The effect size was calculated using the mean difference between pretest and posttest data, divided by the pooled standard deviation, Cohen's d. For Cohen's d, a score of .20–.50 is considered a small effect, .50–.80 a medium effect, and > .80 a large effect (Cohen, 1992). Statistical significance was set at $p < .05$.

For the qualitative data, we used a directed content analysis (Hsieh & Shannon, 2005). Audio recordings were transcribed verbatim, and texts were divided into meaning units, such as words, sentences and paragraphs. The meaning units were independently coded by two researchers (registered nurses [Masters in Nursing Science] with specific training and research experience in qualitative studies); codes were sorted into subcategories, and eventually abstracted to categories identified by Newman et al. (2014). Data that could not be coded into any of the categories derived from the theory were reexamined and resolved by the research group. Exemplar statements were translated from Chinese to English by the principal investigator, cross-checked and then confirmed by two senior researchers who were bilingual (registered nurses, one with a Doctorate in Philosophy and one with a Masters in Nursing Science).

2.7 | Methodological rigour for the qualitative inquiry

The credibility of this study was addressed following the work of Amankwaa (2016). Member checking was undertaken by involving participants in checking the proximity of themes, subthemes and exemplar statements. Senior researchers played an important role in solving discrepancies in the data analysis process to ensure credibility and confirmability. Field notes about participants' responses served as audit trails to substantiate the dependability of the findings.

2.8 | Ethical considerations

Informed consent was obtained from all participants before the start of the study. The Institutional Review Board of the hospital where the study took place approved the study. Participants were well informed of the study's aim, design, methods and ethical principles. They were also informed of their right to withdraw at any time without reason or negative impact. All collected information was kept confidential and anonymous.

3 | RESULTS

3.1 | Participant characteristics

All invited registered nurses ($N = 176$) agreed to complete the pre- and posttest online surveys. On average, participants were 31.38 (±6.89) years old and had been working for 9.58 (±7.65) years. As shown in Table 1, 86.93% were female, 65.34% were married, and 46.59% had an associate's degree; slightly more than a quarter (26.70%) participated in more than one type of leisure activity. The participants who were interviewed ($n = 12$) were aged from 22 to 44 years (mean 30.42; $SD \pm 7.19$ years).

3.2 | Effects on perceived stress, anxiety and depression

As shown in Table 2, the scores on the dimensions of job stressors and total JSS were significantly lower after the intervention. Noticeable pretest and posttest differences were detected in all ($p < .01$) but one dimension ($p > .05$) of job and personal stressors; this dimension is resource and environmental problems. The effect sizes ranged from .26 to .44, indicating a small effect.

The scores for perceived coping ($p < .01$), perceived distress ($p < .05$) and total PSS ($p < .01$) were significantly decreased after the intervention, resulting in a small effect size of .22–.34.

The SAS score decreased significantly, from 48 to 44 ($p < .01$), after the intervention, with an effect size of .42. Thus, the SDS score (48–45, $p < .01$) produced an effect size of .29.

3.3 | Thematic findings

Five themes related to the psychological mechanisms of Newman et al. (2014) were identified from the interview transcripts, based on the contribution of leisure activities to one's well-being (i.e., detachment recovery, autonomy, mastery, meaning and affiliation).

3.3.1 | Detachment recovery

Engagement in leisure activities facilitated psychological and physical detachment from work and daily life pressure, thereby offering

TABLE 1 Descriptive characteristic of participants

	Survey (n = 176)		Semi-structured interviews (n = 12)	
	N (%) or range	Mean (SD)	N (%) or range	Mean (SD)
Age (years)	22-51	31.38 (6.89)	22-44	30.42 (7.19)
Tenure (years)	1-32	9.58 (7.65)	1-26	7.92 (7.53)
Gender				
Female	153 (86.93)		9 (75.00%)	
Male	23 (13.07)		3 (25.00%)	
Marital status				
Married	115 (65.34)		8 (66.67%)	
Unmarried	60 (34.09)		4 (33.33%)	
Separated	1 (.57)		0	
Education				
Associate degree	82 (46.59)		3 (25.00%)	
Bachelor degree	80 (45.45)		5 (41.67%)	
Master degree	14 (7.96)		4 (33.33%)	
Professional post				
Nurse	146 (82.95)		11 (91.67%)	
Head nurse	30 (17.05)		1 (8.33%)	
Types of leisure activities				
One	129 (73.30%)		7 (58.33%)	
Two	30 (17.05%)		3 (25.00%)	
Three	13 (7.39%)		2 (16.67%)	
Four	4 (2.26%)		0	

Abbreviation: SD, standard deviation.

TABLE 2 Mean scores of variables pre and post leisure activities programme with paired t test (N = 176)

Variables	Pre test Mean (SD)	Post test Mean (SD)	Pretestposttest		
			Mean differenceES	t	(95% CI)
Total job stressors	71.26 (±16.62)	64.99 (±15.84)	6.27	3.80**	.39 (3.029.53)
Professional and career issues	16.56 (±4.18)	14.72 (±4.12)	1.84	4.19**	.44 (.972.71)
Workload and time pressure	12.41 (±3.71)	11.05 (±3.34)	1.36	3.67**	.39 (.632.09)
Resource and environmental problems	5.41 (±2.06)	5.27 (±1.96)	.14	.66	.07 (−.27.55)
Patient care and interaction	22.75 (±5.74)	20.98 (±5.45)	1.77	3.07**	.32 (.632.90)
Interpersonal relationships and management issues	14.14 (±4.67)	12.97 (±4.39)	1.17	2.65**	.26 (.302.04)
Total perceived stress	25.78 (±6.43)	23.67 (±5.82)	2.10	3.30**	.34 (.843.35)
Perceived distress	12.15 (±4.02)	11.27 (±4.06)	.89	2.14*	.22 (.011.70)
Perceived coping	13.61 (±3.71)	12.40 (±3.51)	1.21	3.18**	.34 (.461.96)
Self-rating anxiety	48.11 (±10.27)	44.14 (±8.78)	3.97	3.76**	.42 (1.896.05)
Self-rating depression	48.13 (±10.70)	45.16 (±9.84)	2.97	2.73**	.29 (.825.11)

Abbreviations: CI, confidence interval; ES, effect sizes; SD, standard deviation.
*$p < .05$. **$p < .01$.

opportunities for nurses to recover from stress. Some participants regarded attending the sessions as a good alternative emotional expression, as they enjoyed participating. Different types of leisure activities acted as resources to meet different needs, which aided recovery. For example, the Tai Chi practice promotes physical health, while painting, dancing, cooking and flower arranging enhanced life satisfaction. Photography and learning English may increase their self-confidence.

I really enjoyed the painting activity, losing track of time, and not worrying about work and family. It feels so good. (Registered nurse 4, female, 42, married, with one child, 23 years of working experience, gynaecology ward)

3.3.2 | Autonomy

When nurses engage in activities of their own will, they were autonomously motivated. This satisfied their intrinsic motivation through the enjoyment of the activity they did, leading to psychological well-being. Group participation promoted individuals' participation in leisure activities, particularly when their leaders, such as head nurses and managers, were involved.

I like the leisure activity that I participated in. I never felt that it [leisure activity] took up my free time. And if you are interested in the activity, then you won't feel stress all of the time. (Registered nurse 8, female, 25, single, with 4 years of working experience, neonatal intensive care unit)

3.3.3 | Mastery

The programme offered the nurses many learning opportunities and challenges. Mastery is the experience of overcoming a challenge or improving a skill in leisure activities, thereby promoting self-actualization, which, in turn, leads to positive emotions. Some participants expressed concern in terms of professional knowledge, suggesting that some leisure activities groups could be a potential burden for nurses. One nurse suggested:

We learned a lot of professional skills from flower arrangement. These skills strengthened my confidence. (Registered nurse 9, female, 52, married, with one child, with 34 years of working experience, gynaecology ward)

3.3.4 | Meaning

Engaging in meaningful leisure activities adds purpose to one's life, which helps individuals to cope with difficult situations.

I didn't have the chance to touch dancing when I was young. However, now we can learn that in our hospital. It fulfilled my dream. And I am so glad to talk about that. (Registered nurse 12, female, 37, married, with two children, with 15 years of working experience, geriatric medical ward)

3.3.5 | Affiliation

Nurses' participation in leisure activities promoted engagement among colleagues. Most nurses stated that they enjoyed socializing during leisure activities sessions and that the social network was helpful in reducing stress. Some nurses said that the programme increased familiarization with their units and the hospital through interpersonal communication, thus enhancing their sense of belonging.

I am the only male nurse at my unit. When I started working, I was very happy to learn that there are eighty male nurses working at our hospital. We shared our experiences beyond work—such as career planning and the trends of male nurses—through the leisure activities. (Registered nurse 6, male, 36, married, with one child, with 17 years of working experience, operating room)

4 | DISCUSSION

This study evaluated the effects of a group leisure activities intervention on the job stress and psychosocial wellness of Chinese nurses. At the 3-month follow-up, we found that the programme had a significantly favourable effect on job stress, perceived personal stress, self-perceived anxiety and depression. These results substantiate available evidence that participation in leisure activities influences job stress and psychosocial wellness in nurses (Webster et al., 2005). The results also validate Newman et al.'s (2014) psychological mechanisms that linked leisure time to subjective well-being, expanded engagement of all categories of care workers and proposed strategies for quick familiarization with different types of leisure activities.

The programme significantly decreased job stress and perceived personal stress. This finding is consistent with the findings of a Danish national health survey, which found that stress reduction corresponds to involvement in leisure activities (Corazon et al., 2010). The perception that leisure activities improve nurses' stress fits with emerging evidence that leisure activities are generally beneficial in terms of stress management and work outcomes. The benefit could have resulted from the opportunities of being distracted from a stressful environment or the detachment from work-related issues offered by leisure activities (Sonnentag et al., 2017). For example, painting is a leisure activity that might yield positive feelings through detachment from work. Furthermore, the benefit could have resulted from good interpersonal relationships that were achieved through interactive communication. Throughout the programme, participants were encouraged to achieve and maintain good interpersonal relationships. It is possible that engagement in leisure activities with good interpersonal relationships extended their social networks and promoted their affiliation with the organization. This enhanced mutual trust and collaboration among peers leads to stress reduction. Additionally, acquiring cooking, photography and foreign language skills might contribute to an individual's self-confidence by overcoming certain challenges.

Notably, the programme did not significantly improve stress related to resource and environmental issues (e.g., crowded wards, poor work environments and lack of equipment), because participants were nurses who understood that they had little control over those problems (Nantsupawat et al., 2017). However, head nurses also participated in the programme, which might have improved nursing resources and work environments over longer periods.

The programme significantly decreased self-perceived anxiety and depression among participants. This result corresponds with the findings of a previous observational study of 2,264 nurses that showed a positive association between leisure-time physical activity and well-being. A national survey of Portuguese nurses' perceptions of their mental health also reported that nurses who engaged in leisure activities experienced improved mental health (Seabra et al., 2019). Our results support this finding, which suggests the effectiveness of a leisure activity intervention to alleviate anxiety and depression. The participants indicated improved confidence and social interaction; these aspects could act as coping strategies in managing psychosocial factors, leading to decreases in anxiety and depression.

Nurses often work in stressful conditions, which often results in acute and chronic severe stress; this, in turn, may lead to PTSD (Schuster & Dwyer, 2020). The importance of the restorative value of leisure activities is related to enhanced joyfulness, physical vigour, social engagement and cognitive function, as well as a reduction in emotional exhaustion and depression (Chiu et al., 2020). We therefore posit that providing opportunities for leisure activities in hospitals, the most convenient place for nurses to participate, would be beneficial to all frontline nurses. These findings could help hospital managers to find new ways of addressing PTSD among nurses. However, further studies are required to identify the effectiveness of leisure activities on PTSD.

In the view of Newman et al. (2014), participation in leisure activities are linked to subjective well-being (i.e., leisure satisfaction, positive feelings, and negative feelings) through the mechanisms of detachment recovery, autonomy, mastery, meaning and affiliation. These findings can contribute towards explaining why participation in leisure activities decreased nurses' stress, self-perceived anxiety and depression, in this study. Participation in leisure activities provided participants with moments to be away from stressful conditions. They therefore had more time to relieve psychosocial distress and ameliorate negative feelings, contributing to improved psychosocial wellness. Further, participation in leisure activities met nurses' psychological needs. For instance, taking part in the dancing activity with colleagues satisfied their needs for affiliation and detachment relaxation, while photography may have promoted psychological wellness by stimulating the feeling of mastery and autonomy. Considering these findings, understanding nurses' psychological needs and providing opportunities for them to participate in leisure activities that suit their needs may promote nurses' psychosocial wellness.

4.1 | Limitations

Several issues remain for future research on leisure activity interventions. First, this study did not include a control group. It is unclear whether the changes in our participants' perceptions of stress, anxiety and depression were caused by the intervention programme or whether there were other concurrent factors, such as improved workload. A randomized controlled trial should be conducted to examine the effects of this programme on the outcomes. Second, the current study lacks possible standardized implementation, as the leisure activities programme was designed according to Chinese culture, which might jeopardize the generalizability of the results. However, leisure activity interventions satisfying individuals' preferences and settings have been recommended in a previous study (Lee et al., 2018). This study featured a short-term intervention; the long-lasting effects of a leisure activities intervention on stress, self-perceived anxiety and depression still need to be determined.

5 | CONCLUSION

The findings of this study empirically support the hypothesis that participation in leisure activities improves stress and self-perceived anxiety and depression among nurses. The underlying mechanism can be explained by detachment recovery, autonomy, mastery, meaning and affiliation. Taking part in various leisure activities that are suitable for individual interests could potentially be a way of relieving the symptoms of PTSD and enhancing psychosocial wellness and teamwork among nurses; this, in turn, could improve care quality and patient safety.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

A hospital-based leisure activities programme had a significant beneficial effect on job stress, perceived personal stress, self-perceived anxiety and depression among Chinese nurses. Hospital-based group leisure activities are sustainable options for promoting psychosocial wellness among nurses. Investing in providing activities for improving the psychosocial wellness of staff can offer benefits that far outweigh the costs, as nurses' well-being has larger implications for hospitals in terms of decreasing the costs of turnover and increasing patient safety and care quality.

Our findings also have important implications for administrators and managers concerned about the well-being of nurses during the COVID-19 pandemic, where nurses have limited opportunities for leisure activities outside hospitals. Hospital-based leisure activities can serve as a means of facilitating recovery from stressful work. These programmes can be used flexibly by hospital nursing managers to maintain nurses' well-being. For example, flexible work schedules can be arranged to facilitate nurses to follow their passions by actively participating in leisure activities.

AUTHOR CONTRIBUTIONS

FFC, YLZ, HD, XYW, JPB and XFL made substantial contributions to conception and design. FFC, YLZ and XFL drafted the manuscript or revised it critically for important intellectual content. FFC, YLZ, JPB and XFL were responsible for acquisition of data or analysis and interpretation of data. FFC, YLZ, HD, XYW, JPB and XFL were accountable for the accuracy or integrity of any part of the study. FFC, YLZ, HD, XYW, JPB and XFL gave the final approval of the study to be published.

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