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ORIGINAL PAPER

Reduced activity in the form of recreational dancing and menstrual pain in the COVID-19 pandemic — prelaminar observations

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Abstract

Introduction: Recreational dancing as a form of physical activity positively affects physical health and well-being. Lack of exercise entails several health abnormalities, such as increased menstrual pain. The time of the COVID-19 pandemic and lockdown has contributed to reduced physical activity and increased stress.

Aim of study: This study aimed to evaluate the effect of physical activity restriction in the form of recreational dancing on young women's perception of menstrual pain.

Material and methods: The study was conducted during the pandemic period of COVID-19. The study included 183 SARS-CoV-2 uninfected girls aged 18 years who presented to a gynaecologist for worsening menstrual-related pain. The patients were assessed using the VAS pain scale before and during the pandemic. All patients reported in their medical history that they were more physically active before the pandemic, especially in recreational dancing. During the pandemic, the subjects reported a reduction in physical activity; in addition, there was also an increase in stress levels as perceived by the patients; at the same time, an increase in lower abdominal pain associated with menstruation was observed in the pandemic.

Results: The obtained result of $p < 0.001$ indicates that the reduction of physical activity in recreational dancing influences the increase of pain sensations during the pandemonium.

Conclusions: Reducing physical activity in the form of recreational dancing increases menstruation-related pain.

Keywords: dance; physical activity; girls; dysmenorrhea; pain

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Introduction

Dance Movement Therapy (DMT) is defined as the psychotherapeutic use of movement to improve physical health and well-being [1, 2]. In DMT, the movement promotes the individual's emotional, cognitive, physical, and social integration [1]. DMT is a unique therapeutic method for children and teenagers, where a movement is a form of communication [3]. Children often acquire their knowledge of the world through experiences with the body that determine their emotional, social, physical, communicative, and cognitive development. DMT is a process that enables children to explore themselves, the environment, and others. Dance/movement therapists use a variety of approaches: expressive movement, creative dance,

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role-playing, gross motor and perceptual motor activities, and a combination of structured and improvised movement experiences. An essential element of DMT is the development of image and awareness of the individual's body [3]. DMT stimulates the vestibular system, makes the state of consciousness more alert, enhances physical aptitude, and improves the functioning of the cardiovascular system [4]. DMT is increasingly used in treating behavioural, psychological, and medical disorders [5–9]. Recreational dance (as a form of physical exercise) is gaining popularity both as a physical activity and as an element of treatment [10]. It is commonly known that movement provides good physical condition (loss of weight, better cardiovascular system functioning) and reduces anxiety and depression. Recreational dance improves both health and well-being [10].

Dysmenorrhea, a medical term for painful menstrual periods, is the most common gynaecological, period-related complaint among teenagers and young adult women [10, 11]. Dysmenorrhea in girls is usually a primary (functional) character and is associated with regular ovulatory cycles and the absence of pelvic pathology. The most frequent causes of secondary dysmenorrhea connected with pelvic pathology are endometriosis, pelvic inflammatory disease, congenital Müllerian anomalies, and ovarian cysts. Prostaglandins and leukotrienes play a crucial role in the etiopathogenesis of dysmenorrhea [11, 12], which often occurs during puberty, usually within six months to 2 years post menarche, when menstrual cycles become ovulational [13]. Dysmenorrhea is characterized by lower abdominal and lower back pain, which may radiate down to the groin area or lower limbs. The symptoms usually appear with menstruation or a day before, lasting 2–3 days, peaking with the maximum menstrual flow, and are more or less similar in particular cycles. Many teenage girls with dysmenorrhea also report symptoms such as headaches, nausea, vomiting, motor disorders, asthenia, irritability, and myalgia [12]. The pathophysiological mechanisms of dysmenorrhea are well-known: overproduction of uterotonic and vasoconstrictive factors, as well as an increased level of blood circulation and menstrual PGF2, causing myometrial ischemia, cramping pain, and systemic symptoms [12].

Physical activity improves well-being and lowers anxiety and stress levels [13, 14]. Dysmenorrhea has a real influence on everyday life and physical activity. It should be treated as a public health issue, supported by educational and information campaigns for girls, their parents, and healthcare professionals [12]. The COVID-19 pandemic has become a common phenomenon facing the contemporary world in the time of globalization [14]. This also poses a challenge for gynaecologists.

Aim of study

The objective of this study was to conclude based on medical observations related to dysmenorrhea in gynaecological practice during the COVID-19 pandemic and the significance of the reduced physical activity, such as recreational dance.

Material and methods

Participants

This study voluntarily comprised 183 18-year-old girls not infected with COVID-19 who had reported to a gynaecologist during the pandemic due to dysmenorrhea. The study protocol was approved by the Bioethics Committee of the Poznan University of Medical Sciences (permit no. KB/553/2018), and the study was conducted by the requirements of the Declaration of Helsinki. In the extended medical history, the girls answered three questions: Was your physical activity (recreational dance) higher before the pandemic? Was your well-being more positive? Did your level of stress increase during the pandemic? The inclusion criterion was dysmenorrhea, while the exclusion criterion was COVID-19 diagnosed on the examination day. In the extended medical history, all the participants reported that the period of the pandemic and lockdowns considerably reduced their physical activity (recreational dance), increased their stress, and decreased their well-being. The women examined were not treated pharmacologically, which included being treated hormonally and with antidepressants.

Pain assessment

The pain was assessed using the Visual Analogue Scale (VAS) [15]. The participants were asked to rate their dysmenorrhea subjectively. The patients' retrospective subjective feelings related to this pain before the pandemic were compared to evaluate whether reduced physical activity (recreational dance) and stress levels associated with the pandemic and lockdowns had intensified dysmenorrhoea. The VAS was a 10-cm line that represented a continuum between the two ends of the scale — no pain (0) and unbearable pain (the most potent pain you can imagine) (10) [15].

Physical Activity Questionnaire

The women who were examined participated in recreational dance classes that were conducted by a professional female dancer. The girls took part in les-

sons once a week in the afternoon hours, the duration of the classes (physical activity) amounted to 90 minutes.

Classes were conducted according to the following protocol:

1. Stretching muscles — 10 minutes,
2. Warm-up — 10 minutes,
3. Repeating a mastered dance routine — 45 minutes,
4. Break — 5 minutes,
5. Learning new choreography — 15 minutes,
6. Breathing exercises as a form of cool-down at the end of classes — 5 minutes.

Statistical analysis

The essential descriptive characteristics with the following data: mean, standard deviation, median, 1st quartile, 3rd quartile, minimum and maximum, were used to describe the intensity of dysmenorrhea on the VAS. To determine the statistical significance between the values indicated by the participants on the VAS and the time of dysmenorrhea (before and after the pandemic), nonparametric Wilcoxon matched-pairs tests were conducted. Statistical significance was set at $p < 0.05$. All calculations and statistical analyses were performed using STATISTICA software v. 10 PL [16].

Results

All the participants reported that before the pandemic and lockdowns, they were more physically active, including movement related to recreational dance, their well-being was more positive, and their stress level was lower. In the extended medical history, all the participants stated that the period of the pandemic and lockdowns reduced their physical activity (recreational dance), reduced their well-being, and increased their level of stress.

The primary score statistics are shown in Table 1, namely Mean and SD, Median, 1st Qu, 3rd Qu, Minimum, and Maximum VAS for pain severity in the girls before and during the pandemic in 2020 and 2021. The results indicate a lesser sensitivity to dysmenorrhea among the girls before the pandemic than during the pandemic.

The results of the nonparametric Wilcoxon matched-pairs tests indicate a statistical significance related to stronger dysmenorrhea among the participants during the pandemic (p-value < 0.001) in 2020 and 2021 than before the pandemic (Tab. 2, Fig. 1, 2).

Discussion

The objective of this pilot study was to verify whether reducing a physical activity like recreational dance reduced well-being along with a higher level of stress due to the pandemic and could be associated with increased sensitivity to dysmenorrhea. Our pilot studies showed a significant difference for VAS ($p < 0.001$). All the participants reported that before the pandemic,

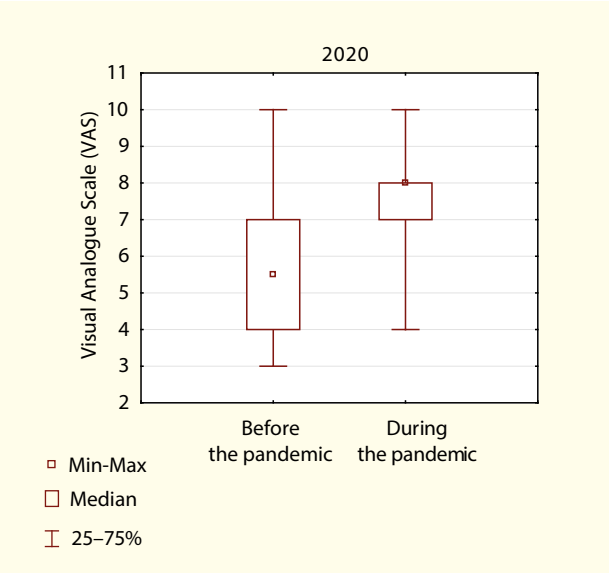

Figure 1. Box and whisker plot of pain measured by VAS among the girls before and during the COVID-19 pandemic in 2020

Table 1. Descriptive statistics for VAS

Year	2020		2021	
Time	Before the pandemic	During the pandemic	Before the pandemic	During the pandemic
n	58	58	125	125
Mean	5.6	7.6	5.8	7.3
SD	1.6	1.3	1.7	1.6
Median	5.5	8.0	6.0	8.0
1st Qu	4.0	7.0	4.0	6.0
3rd Qu	7.0	8.0	7.0	8.0
Min.	3	4	3	4
Max.	10	10	10	10

n — number of observations; SD — Standard Deviations; 1st Qu — first quartile; 3rd Qu — third quartile; Min. — minimum; Max. — maximum

they were more physically active (such as in recreational dance), their well-being was more positive, and they experienced less stress. Hence, 49.9% of the study population reported more severe dysmenorrhea during the COVID-19 pandemic compared to 36.9% beforehand (p = 0.000).

Dysmenorrhea was significantly associated with sports disruptions and daily activities during the pandemic [17]. Pain and physical (somatic) suffering result directly from a disturbed nervous system function, causing the body to respond. In gynaecological practice, pain is often linked to menstruation. Dysmenorrhea results from the contractile activity of the uterus caused by prostaglandins (metabolites of arachidonic acid) produced in the endometrium, vessels, and myometrium thanks to COX; their production is enhanced by oestrogens and inhibited by progesterone. Uterine contractions cause vascular compression and brief ischaemia of the organ, resulting in pain, which may be intensified by heavy bleeding (increased exposition to prostaglandins), smoking cigarettes (contraction of blood vessels), and individual qualities (a low pain threshold, emotional susceptibility). Painful menstruation may be accompanied by symptoms from the digestive or sympathetic systems (resulting from the systemic activity of prostaglandins). PMS (premenstrual syndrome) often appears with dysmenorrhoea (breast pain and oedema, labile mood) [18]. It often relieves after the first pregnancy (a reduced number of adrenergic neurons participating in uterine contractions), though this is not a rule [19].

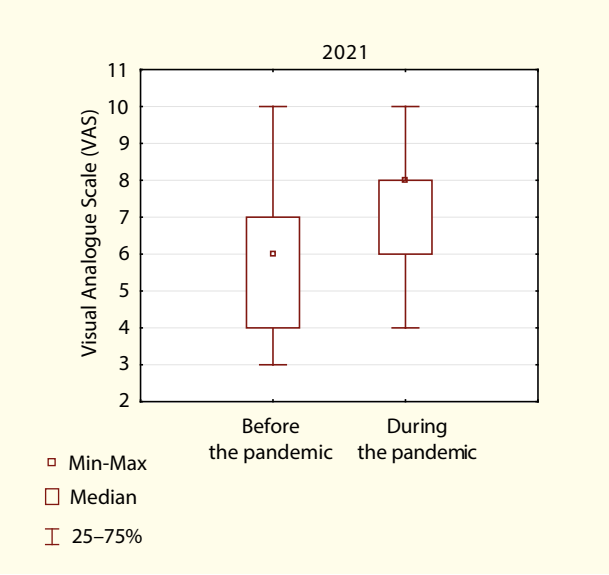

Figure 2. Box and whisker plot of pain measured by VAS among the girls before and during the COVID-19 pandemic in 2021

According to strict diagnostic criteria, an estimated 2.5–5% of girls and women are affected by PMS, yet some researchers maintain that the symptoms of PMS may be prevalent in as many as 40–80% of girls and women [19].

Pain related to dysmenorrhea is connected with the absence of participation in sports and social activities; it also influences participation in educational classes, translating into learning outcomes, thus affecting the decrease of life quality [17, 18, 20]. It has been indicated that family history is an essential indicator for dysmenorrhea, as pain behaviour is learned from mothers who have menstrual complaints [21, 22]. In addition, genetic similarity might play a role due to similar reactions to prostaglandins that may lead to dysmenorrhea [22].

The influence of physical effort on dysmenorrhea was well-known and common in the literature. It is proven that physical exercise has a positive effect on reducing dysmenorrhea [23, 24].

The COVID-19 pandemic and lockdowns presented a new situation for humanity. The pandemic has significantly impacted many people's mental health, resulting in loneliness, social isolation, financial strain, anxiety, fear of contracting the virus, and uncertainty for the future [25]. Our pilot study on a Polish population revealed that the female research participants reported a greater sensation of stress and mood disorders during the pandemic than before it (in a research questionnaire, the level of fear was not evaluated).

Research conducted by Aolymat et al. [20] proved that during the COVID-19 pandemic, dysmenorrhea and symptoms of PMS (such as headache, palpitations, and urinary urgency) intensified among women. Phelan et al.'s research [25], with the participation of 1031 women, proved that stress during the COVID-19 pandemic negatively influenced women's reproductive health. In the group of examined women, significant

Table 2. Wilcoxon test results (significant p < 0.05)

Year	2020		2021	
Time	Before the pandemic	During the pandemic	Before the pandemic	During the pandemic
n	58	58	125	125
Z	6.39		8.55	
p	< 0.0001		< 0.0001	

n — number of observations; Z — Wilcoxon pair order test result; p — level of significance of differences

increases in a low mood, weak appetite, weak concentration, anxiety, inadequate sleep, and loneliness were also observed [25]. It is worth emphasizing that women living under stress are twice as likely to develop painful periods than those with less stressful everyday life. The main reason for this is a hormone imbalance caused by severe stress that increases the level of prostaglandins, i.e., pain-generating tissue hormones [26]. The pandemic impacted female mental and sexual health and partner relationships with increased violence against women [18].

Some risk factors for SARS-CoV-2 may influence the hypothalamic-pituitary-gonadal axis, resulting in menstrual disorders, skin issues, and urogynaecological problems [18]. It is already known that some viral infections correlate with changes in the female reproductive system, such as the duration of the menstrual cycle or the volume of menstruation (e.g., in human immunodeficiency virus (HIV)-positive women) [27].

Among women who fell ill with COVID-19, Li et al. [28] observed lengthening menstrual cycles in relation to their periods before falling ill. A lengthening of menstrual cycles was also observed in women who experienced complications after falling ill with COVID-19. In research by Khan et al. [29], female participants who had gotten over COVID-19 reported irregular menstruation most frequently.

The study by Madendag et al. among 132 women aged 18–40 asked, 'Can the SARS-CoV-2 virus injure the ovaries?'. Their findings showed that the SARS-CoV-2 virus does not affect the ovarian reserve. Still, the changes in menstruation status can be connected with an extreme immune response and inflammation or COVID-19-related psychological stress and anxiety [30].

The level of stress is related to menstrual disorders [25, 26, 30]. In women with a high-stress level, a significant lengthening of menstruation and heavier bleeding during menstruation during the time of COVID-19 were observed [31]. Research conducted by Muharam et al. [32], in which 158 women took part, proved that infection with COVID-19 influenced menstrual disorder. In women remaining in isolation, psychotic symptoms, neurosis, and post-traumatic stress were observed.

Limited physical activity during the COVID-19 pandemic and lockdowns increased the number of risk factors for cardiovascular diseases, reduced well-being, and deepened the social distance between people [33–35]. One health consequence of COVID-19 and lockdowns is weight gain, leading to overweight and obesity among children, teenagers, and adults [36, 37].

Many pain-related gynaecological problems impinge on women's psychosexual sphere. For this reason, it is worth paying attention to the holistic approach to dysmenorrhea. Physiotherapeutic and osteopathic intervention in the form of visceral techniques of the female reproductive organs to reduce small pelvic tension and pain may be supportive. Physiotherapy may be an alternative method to relieve dysmenorrhea [38, 39]. Other effective procedures include TENS electrostimulation and acupuncture [11]. Non-pharmacological methods for fighting pain are yoga and stretching exercises [40], whereas dance aerobics is more efficient in reducing pain sensitivity than stretching exercises and in lowering the level of stress [41].

For many years, studies have evaluated body composition to show differences with age and the menstrual cycle phase in girls and women, as well as among people with eating disorders, malnutrition, overweight, or obesity [42, 43]. The findings seem to confirm the importance of lifestyle in preventing menstrual pain and PMS. A balanced diet and physical activity should be considered, as they facilitate maintaining and/or striving for a better body mass and fat mass. Continuing studies on menstrual pain in girls and women with PMS. It is also crucial to improve recommendations regarding intervention within lifestyles considerably disturbed by the lockdowns during the pandemic. Our small research group gives rise to significant limitations, but the outcomes indicate the value of continuing this study in larger and different age groups.

The pilot studies presented in this paper show that the COVID-19 pandemic and the lockdowns had a negative impact on greater menstrual pain in girls and women. The results revealed that intense pain during the pandemic and the lockdowns could be associated with a lifestyle change from an active to a mainly sedentary lifestyle. All the participants reported significantly limited activity during the lockdowns: in the case of our pilot studies, the girls before the COVID-10 pandemic had been more active. They had taken part in dance classes more frequently. Although the stress level was not evaluated, this factor is undoubtedly connected with the pandemic. It affects menstruation cycles (particularly during puberty), which is associated with the impact on the hypothalamic–pituitary–gonadal axis–the influence of lifestyle and physical activity [44, 45].

Extending the groups and division into age subgroups should be considered. It is worth considering lifestyle factors such as diet and physical activity about stress.

The results of our studies suggest an area for future scientific studies and the search for other factors impacting intense menstrual pain concerning lifestyle to ultimately develop recommendations significant for GPs, gynaecologists, mental health counsellors, and physical therapists. Any activities striving to establish

preventive and intervention measures to relieve the negative consequences of the COVID-19 pandemic and the lockdowns are necessary.

Limitations

These pilot studies did not assess the stress level using DASS-21 or any other questionnaire, which is a study limitation. In addition, the stress the subjects experienced during the pandemic may have been an additional limitation of the study.

A further limitation of the study is the small study group. In subsequent research on menstrual pain, observations should be made with a division into age groups and lifestyle, including physical activity.

Conclusions

Reduced physical activity in the form of recreational dance increases dysmenorrhea. More frequent dysmenorrhea can be observed as a psychosomatic response to stress during the pandemic. In the extended medical history, all the participants reported that the pandemic and lockdowns reduced their physical activity, like recreational dance, increased stress, and reduced their well-being. Undoubtedly, these studies require more exploration of the influence of recreational dance as a form of physical activity on stress and cognitive functions among young women with dysmenorrhea.

Implications for practice

In the future, interdisciplinary management algorithms should be prepared, which will protect women's quality of life in the event of further lockdowns.

Article information

Data availability statement

The authors used information contained in the articles listed in the references.

Ethics statement

The study protocol was approved by the Bioethics Committee of the Medical University in Poznań (permit no. KB/553/2018). Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Author contributions

All authors contributed equally to writing the article.

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Conflict of interest

The authors declare no conflict of interest.

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