

## **Perceived Training Performance Across Menstrual Cycle Phases Among Female Athletes: A Quantitative Study**

Beverly T. Francisco, Nicca Dennise D. Diaz,  
Cherry Grace B. Alejandro, Joshua S. Parnoncillon,  
Ralph John Mickeal S. Salcedo, Mohammad Yaseef T. Ututalum

[Hz202300742@wmsu.edu.ph](mailto:Hz202300742@wmsu.edu.ph), [Hz202303255@wmsu.edu.ph](mailto:Hz202303255@wmsu.edu.ph)  
[Hz202301957@wmsu.edu.ph](mailto:Hz202301957@wmsu.edu.ph), [hz202300457@wmsu.edu.ph](mailto:hz202300457@wmsu.edu.ph),  
[hz202300240@wmsu.edu.ph](mailto:hz202300240@wmsu.edu.ph)

Western Mindanao State University, Zamboanga City 7000, Philippines

## Abstract

This study aimed to examine the perceived training performance of female athletes across different phases of the menstrual cycle, specifically determining the level of perceived performance, identifying significant differences across phases, and assessing the relationship between perceived performance and fatigue, recovery, and related symptoms. A non-experimental quantitative descriptive-correlational research design was employed, and data were collected from 30 female student-athletes of Western Mindanao State University using a structured questionnaire. The findings revealed that respondents reported a very high level of perceived variation in training performance in terms of strength, endurance, speed, coordination, and overall ability across menstrual cycle phases. However, results from one-way ANOVA showed no significant difference in perceived training performance across the menstrual, follicular, ovulatory, and luteal phases. Furthermore, multiple regression analysis indicated that fatigue, recovery, and menstrual-related symptoms did not significantly predict perceived training performance. The study concludes that although female athletes strongly perceive changes in their training performance throughout the menstrual cycle, these variations are not statistically significant, highlighting the importance of individualized training approaches that consider athletes' perceptions and experiences.

**Keywords:** *Fatigue, Female Athletes, Menstrual Cycle, Perceived Training Performance, Recovery*

## Introduction

Perceived training performance refers to how female athletes evaluate their strength, endurance, focus, and overall ability during training. These perceptions may change throughout the menstrual cycle due to hormonal fluctuations that affect energy, mood, fatigue, and recovery. Many athletes report feeling weaker, more tired, or less motivated during menstruation and the luteal phase, even when actual performance does not significantly decline (Carmichael et al., 2020; Wen et al., 2021; Meignié et al., 2019).

International studies from countries such as the United Kingdom, Australia, the United States, and Europe show growing interest in how the menstrual cycle affects female athletes. Research suggests that many athletes experience changes in energy,

motivation, fatigue, and recovery during different menstrual phases, although responses vary among individuals and sports (Carmichael et al., 2021; McNulty et al., 2020; Meignié et al., 2021).

In the Philippines, awareness of the menstrual cycle's effect on female athletes is gradually increasing. Local studies report that many Filipino female athletes experience fatigue, cramps, mood changes, and lower motivation during menstruation, which may influence how they perceive their training performance (Philippine Journal of Health Research and Development, 2022).

In Metro Manila and Northern Mindanao, studies involving university student-athletes also show that menstrual symptoms may affect training intensity and perceived performance. Female athletes commonly report fatigue, discomfort, and reduced motivation during menstruation and the luteal phase, although most studies focus mainly on symptoms rather than performance outcomes.

This study may help improve understanding of how the menstrual cycle affects the perceived training performance of female athletes. The findings may guide coaches and trainers in developing training programs that consider the physical and emotional experiences of female athletes during each menstrual phase. It may also support strategies that improve athletes' training experience, consistency, and overall well-being.

### **Statement of the Problem**

This study aimed to determine the menstrual cycle phase and training outcome type of female athletes. Specifically, it sought to answer the following questions:

1. What is the perceived training performance of female athletes during the different phases of the menstrual cycle?
2. Is there a significant difference in perceived training performance across the different menstrual cycle phases?
3. Is there a significant relationship between the perceived training performance of female athletes and their fatigue and recovery, combined with symptoms and performance influence during different phases of the menstrual cycle?

## **METHODS**

### **Research Design**

This study utilized a non-experimental quantitative descriptive-correlational research design to examine the relationship between menstrual cycle phases and

perceived training performance among female athletes. A quantitative approach was appropriate as it allowed for the systematic collection of measurable data on how athletes perceived their performance in terms of strength, endurance, energy levels, and overall training capacity across different phases of the menstrual cycle. Hormonal fluctuations throughout the cycle have been shown to influence both physical and psychological responses in athletes, making this approach suitable for capturing such variations, as supported by McNulty et al. (2020) and Bruinvels et al. (2017). The descriptive component aimed to determine the level of perceived training performance in each phase, while the correlational component identified significant relationships between menstrual cycle phases and performance variations, as supported by similar studies such as Findlay et al. (2020). Data were collected using structured survey instruments and analyzed through appropriate statistical methods to ensure objectivity. Overall, this design was appropriate as it provided a clear, systematic, and evidence-based understanding of how menstrual cycle phases were associated with perceived training performance among female athletes.

### **Research Locale**

The study was conducted at Western Mindanao State University, a state-funded higher education institution located in Zamboanga City. The university's main campus served as the research locale, as it provided organized athletic programs and training facilities for student-athletes participating in accredited intercollegiate sports competitions. This locale was selected due to its accessible population of college female athletes with regular menstrual cycles and its suitability for examining training performance and fatigue within the context of academic and athletic demands experienced by Filipino student-athletes.

### **Research Respondents**

The population consisted of 30 female athletes who were registered at Western Mindanao State University and were participating in the university's formal training programs. The activities were not limited to bodybuilding but covered various types of physical activities. The study included all eligible female athletes, which optimized representativeness.

### **Research Instrument**

The researchers developed a self-administered questionnaire for the purpose of conducting the study. The questionnaire had three main sections to collect data from the respondents. Section 1 examined the participants' profile, including age, sport

played, years of experience as an athlete, and training background. The second part, the Menstrual Cycle Phase Identification Form, determined whether participants were in the follicular, ovulatory, or luteal phase based on the timing of their cycle. This categorical approach followed a calendar-based method, typically the 28-day cycle pattern, and was further verified through self-report. In the third part, respondents were given a fatigue assessment scale, which was a modified version of the Rating of Perceived Exertion (RPE) scale and the Multidimensional Fatigue Inventory (MFI-20). This measured the perceived fatigue during training sessions using a Likert-type scale ranging from 1 ("very low fatigue") to 5 ("very high fatigue"). Athletes used this scale to indicate the intensity of fatigue experienced across different menstrual cycle phases. Three experts in sports validated the content of the instrument. The study was also conducted on 15 female athletes for clarity and consistency. The findings of the pilot testing indicated the internal consistency of the questionnaire. The evaluation was done with Cronbach's alpha was calculated to be equal to  $-0.774$  the instrument is reasonably reliable, suggests that the items. These items are uniform in measuring the parameters intended to be measured in the study.

### **Data Gathering Procedure**

The researchers first secured approval from the Research Ethics Committee and obtained permission from the College of Sports Science and Physical Education of Western Mindanao State University before conducting the study. Coordination with coaches, sports coordinators, and advisers was also carried out to identify qualified female athletes who met the inclusion criteria of the study.

### **Pre-Data Gathering Procedure**

Before the conduct of the study, the researchers secured approval from the Research Ethics Committee and obtained permission from the Dean of the College of Sports Science and Physical Education of Western Mindanao State University. Coordination with coaches, sports coordinators, and advisers was also conducted to identify qualified female athletes who met the inclusion criteria of the study. The researchers prepared and validated the research questionnaire with the help of experts in sports science and physiology to ensure content validity and reliability. A pilot test was conducted among 15 female athletes to assess the clarity, consistency, and reliability of the instrument. The questionnaire obtained a Cronbach's alpha value of  $0.774$ , indicating acceptable reliability. After validation, the researchers finalized the questionnaire and prepared the informed consent forms and data collection materials.

### **Actual Data Gathering Procedure**

The actual data gathering started with an orientation conducted by the researchers to explain the purpose, objectives, and procedures of the study. The respondents were informed about their rights as participants, including confidentiality, voluntary participation, and the freedom to withdraw at any time without penalty. After the orientation, informed consent forms were distributed and signed voluntarily by the participants. The questionnaires were administered during scheduled training sessions to avoid disruption of athletic activities. Respondents answered the profile sheet, menstrual cycle phase identification form, and fatigue and perceived training performance questionnaire. The menstrual cycle phase of each participant was identified based on self-report and menstrual tracking records. Fatigue and performance ratings were gathered immediately after training sessions to ensure accurate responses. The researchers personally supervised the administration and retrieval of questionnaires to ensure completeness and accuracy of the data collected.

### **Post-Data Gathering Procedure**

After the retrieval of questionnaires, the researchers checked all responses for completeness and consistency. Incomplete or unclear responses were verified and corrected whenever possible. The collected data were then organized, coded, and tabulated using Microsoft Excel and SPSS for statistical analysis. All information gathered from the respondents was treated with strict confidentiality. Personal identities and menstrual-related information were anonymized and stored securely to protect the privacy of the participants. After the statistical treatment and interpretation of results, the findings were summarized, discussed, and used as the basis for conclusions and recommendations of the study.

### **Statistical Treatment of Data**

The data gathered in the study were analyzed using descriptive and inferential statistics. Frequency and percentage were used to describe the demographic profile of the respondents in terms of age, year level, sports participation, training experience, and average training sessions per week. Mean and standard deviation were utilized to determine the level of perceived training performance of female athletes during the different phases of the menstrual cycle. To determine whether there was a significant difference in training performance across menstrual cycle phases, One-Way Analysis of Variance (ANOVA) was employed. Meanwhile, Multiple Regression Analysis was used to determine the significant relationship between training performance and

fatigue, recovery, symptoms, and performance influence during different phases of the menstrual cycle. All hypotheses were tested at a 0.05 level of significance. The Statistical Package for the Social Sciences (SPSS) was used to ensure accurate computation, interpretation, and presentation of the data.

## RESULTS

This chapter highlights the profile of the respondents in terms of age, year level, sports events they engage with, years of training experience and average training session per week. In addition, this chapter presents the key statistical findings of the study aligned with the specific research problems posited in the first chapter. The null hypotheses based on the inferential questions are likewise presented in this chapter along with the summary of the statistical findings.

### The Demographic profile

**Table 1**

*Demographic Profile*

| Profile    | Category             | Frequency | Percentage | Total |
|------------|----------------------|-----------|------------|-------|
| Age        | 19                   | 4         | 13.3       | 100   |
|            | 20                   | 8         | 26.7       |       |
|            | 21                   | 16        | 53.3       |       |
|            | 23                   | 1         | 3.3        |       |
|            | 25                   | 1         | 3.3        |       |
| Year Level | 2 <sup>nd</sup> year | 10        | 33.33      | 100   |
|            | 3 <sup>rd</sup> year | 20        | 66.67      |       |
| Sports     | Volleyball           | 4         | 13.3       | 100   |
|            | Arnis                | 4         | 13.3       |       |
|            | Athletics            | 5         | 16.7       |       |
|            | Swimming             | 2         | 6.7        |       |
|            | Basketball           | 4         | 13.3       |       |
|            | Futsal               | 7         | 23.3       |       |
|            | Softball             | 2         | 6.7        |       |
|            | Taekwondo            | 1         | 3.3        |       |
|            | Pickleball           | 1         | 3.3        |       |
|            | 1 year               | 13        | 43.3       | 100   |

|                            |            |    |       |     |
|----------------------------|------------|----|-------|-----|
| Training<br>Experienc<br>e | 2 years    | 7  | 23.3  | 100 |
|                            | 3 years    | 2  | 6.7   |     |
|                            | 4 years    | 1  | 3.3   |     |
|                            | 5 years    | 5  | 16.7  |     |
|                            | 7 years    | 1  | 3.3   |     |
|                            | 11 years   | 1  | 3.3   |     |
| Average                    | 2 sessions | 3  | 10    | 100 |
| Training                   | 3 sessions | 13 | 43.33 |     |
| Session                    | 4 sessions | 6  | 20    |     |
| Per Week                   | 5 sessions | 8  | 26.67 |     |

The respondents are predominantly early-20s students, with the majority aged 21 years (53.3%) and mostly in their 3rd year of study (66.7%). In terms of sports participation, futsal is the most popular (23.3%), followed by athletics (16.7%), while volleyball, Arnis, and basketball each account for 13.3%, and other sports such as swimming, softball, taekwondo, and pickleball are less common. Most respondents have relatively short training experience, with 1 year being the most common (43.3%), and many engage in training regularly, with 3 sessions per week being the most frequent (43.3%), followed by 5 and 4 sessions per week. Overall, the data suggest that the respondents are active, primarily upper-level students who participate in team sports and maintain a consistent training routine.

### Presentation of Data Based on Research Questions

#### Research Problem 1. What is the training performance of female athletes during the different phases of the menstrual cycle?

**Table 2**

*Training Performance of Female Athletes During Different Phases of Menstrual Cycle*

| Statement                                                                                     | Mean | Interpretation |
|-----------------------------------------------------------------------------------------------|------|----------------|
| My strength (ability to lift or perform resistance exercises) vary across my menstrual cycle. | 4.60 | Very High      |
| My endurance (ability to sustain aerobic activity) varies across my menstrual cycle.          | 4.47 | Very High      |
| My speed and agility are affected by my menstrual cycle.                                      | 4.57 | Very High      |



|                                                                             |             |                  |
|-----------------------------------------------------------------------------|-------------|------------------|
| I feel more explosive/powerful during certain phases of my menstrual cycle. | 4.37        | Very High        |
| My coordination and reaction time are influenced by my menstrual cycle.     | 4.53        | Very High        |
| <b>Overall mean</b>                                                         | <b>4.51</b> | <b>Very High</b> |

*Legend: 1.0-1.80: Very Low; 1.81-2.60: Low; 2.61-3.40: Moderate; 3.41-4.20: High; 4.21-5.00: Very High*

Table 2 presents the training performance of female athletes during the different phases of the menstrual cycle. The results show that all indicators obtained very high mean scores, suggesting that athletes strongly perceive that their performance varies across menstrual cycle phases. Among the indicators, the statement “My strength (ability to lift or perform resistance exercises) vary across my menstrual cycle” obtained the highest mean ( $M = 4.60$ ), interpreted as Very High, indicating that respondents strongly believe their strength changes depending on the phase of their menstrual cycle. Similarly, speed and agility ( $M = 4.57$ ) and coordination and reaction time ( $M = 4.53$ ) were also rated Very High, suggesting that these physical abilities are noticeably influenced by menstrual cycle phases.

In addition, endurance ( $M = 4.47$ ) and explosiveness or power ( $M = 4.37$ ) also received Very High interpretations, indicating that respondents perceive variations in their ability to sustain aerobic activity and produce powerful movements throughout the cycle. The overall mean of 4.51, interpreted as Very High, indicates that female athletes strongly perceive that their training performance, including strength, endurance, speed, power, and coordination, is influenced by the different phases of the menstrual cycle. This suggests that menstrual cycle phases may play an important role in shaping training experiences and physical performance among female athletes.

### **Research Problem 2. Is there a significant difference in training performance across the different menstrual cycle phases?**

**Table 3**

*One-way ANOVA of the Significant Difference in Training Performance of Female Athletes Across the Different Menstrual Cycle Phases*

| Phases    | Mean | df | F-value | p-value | Remarks |
|-----------|------|----|---------|---------|---------|
| Menstrual | 4.48 | 3  | 0.756   | 0.529   |         |

|            |      |                    |
|------------|------|--------------------|
| Follicular | 4.40 | Not<br>Significant |
| Ovulatory  | 4.51 |                    |
| Luteal     | 4.60 |                    |

The results of One-way Analysis of Variance is in Table 3 Assessing the differences in training performance based on statistical tests. varied female athletes during their menstrual cycle phases. The outcomes. The luteal phase had the highest mean score ( $M = 4.60$ ) followed by the other phases of the menstrual cycle. The menstrual phase had an average mean of 4.48. Follicular phase (mean = 4.40).

The techniques differ marginally across stages, but the. The difference, as shown by the calculated F-value (0.756) and p-value (0.529), is not significant. lacks statistical significance. Since the p-value (0.529) is greater than the 0.05 level of significance, we cannot reject the null hypothesis. We do not reject the null hypothesis. There is no significant means that. Variation in the performance of sportswomen during the menstrual cycle. In the phases of the ovulatory cycle, female athletes reported a great deal of training. According to the statistical evaluation, performance across all phases.

Menstrual cycle phase does not affect the overall training tests. functioning. Athletes have a rather stable training schedule. The phase of their menstrual cycle doesn't affect performance.

**Research Problem 3. Is there a significant relationship between the training performance of female athletes with their fatigue and recovery combined with symptoms and performance influence during different phases of menstrual cycle?**

**Table 4**

*Multiple Regression Analysis Showing Relationship of Female Athletes' Training Performance and Fatigue and Recovery Combined with Symptoms and Performance Influence During Different Phases of Menstrual Cycle*

| Variables             | B     | SE    | $\beta$ | p-value | Interpretation     |
|-----------------------|-------|-------|---------|---------|--------------------|
| Fatigue and Recovery  |       |       |         |         |                    |
| Combined with         | 0.066 | 0.166 | 0.075   | 0.695   | Not<br>Significant |
| Symptoms and          |       |       |         |         |                    |
| Performance Influence |       |       |         |         |                    |

Note:  $R^2=0.006$ ;  $F= 0.157$ ;  $p=0.695$

Table 4 presents the results of the Multiple Regression Analysis conducted to determine whether fatigue and recovery combined with symptoms and performance influence during different phases of the menstrual cycle significantly predict the training performance of female athletes. The results show that fatigue and recovery combined with symptoms and performance influence obtained a beta coefficient ( $\beta = 0.075$ ) with a p-value of 0.695, which is greater than the 0.05 level of significance. This indicates that the variable does not significantly predict the training performance of female athletes.

Furthermore, the Coefficient of Determination ( $R^2 = 0.006$ ) suggests that only 0.6% of the variance in training performance is explained by fatigue and recovery combined with symptoms and performance influence. The model also yielded an F-value of 0.157 with a p-value of 0.695, which confirms that the regression model is not statistically significant. Overall, the findings indicate that fatigue and recovery combined with symptoms and performance influence during different phases of the menstrual cycle do not have a significant relationship with the training performance of female athletes. This suggests that other factors not included in the model may play a more important role in influencing athletes' training performance.

## DISCUSSION

The chapter provides a discussion and interpretation of the results. The major findings in the light of the research questions of the dissertation are explained here. It also elaborates the findings with the existing literature and their theoretical and practical implications. Additionally, the chapter outlines unanticipated findings. Lastly, it provides a general overview of the study.

### **Perceived Training Performance of Female Athletes During the Different Phases of the Menstrual Cycle**

The results revealed that all indicators of training performance obtained very high mean scores, indicating that female athletes strongly perceived variations in their performance across the different phases of the menstrual cycle. Among the indicators, strength obtained the highest mean score, followed by speed and agility, coordination, endurance, and power. This suggests that the respondents were highly aware of perceived fluctuations in their physical performance throughout the menstrual cycle.

In contrast, some studies argue that perceived performance differences may not always reflect actual physiological changes. It has been suggested that such variations may be influenced by psychological factors, personal expectations, or subjective interpretation rather than measurable performance decline across menstrual phases.

However, the findings are supported by related literature emphasizing the role of hormonal fluctuations in athletic performance. Variations in estrogen and progesterone levels have been shown to influence muscle strength, metabolism, thermoregulation, and fatigue response in female athletes (McNulty et al., 2020; Wikström-Frisén et al., 2022). These physiological changes may help explain the reported variability in perceived training performance.

### **Significant Difference in Perceived Training Performance Across the Different Menstrual Cycle Phases**

The findings revealed that there was no significant difference in perceived training performance across the different phases of the menstrual cycle. However, descriptive results showed that performance was highest during the luteal phase, followed by the ovulatory phase, menstrual phase, and follicular phase. Overall, the results suggest that performance remains relatively stable across menstrual cycle phases.

On the other hand, some studies have reported that hormonal fluctuations may significantly influence physical performance, particularly in strength, endurance, and recovery. These findings suggest that performance variations may occur across different phases of the menstrual cycle, depending on the individual athlete.

Nevertheless, the present results are consistent with recent literature indicating that menstrual cycle phase does not consistently affect performance outcomes. Studies by Gibbons et al. (2024) and Elliott-Sale et al. (2025) suggest that hormonal fluctuations do not always translate into measurable performance differences. This supports the need for individualized, athlete-centered training approaches rather than phase-based training modifications.

### **Significant Relationship Between Perceived Training Performance and Fatigue, Recovery and Symptoms**

The results showed that fatigue, recovery, and symptoms did not significantly predict perceived training performance among female athletes. The very low  $R^2$  value

indicated that only a minimal percentage (0.06%) of performance variation was explained by these variables.

In contrast, some literature suggests that fatigue, poor recovery, and menstrual-related symptoms may negatively affect athletic performance by reducing physical capacity and psychological readiness, particularly during specific menstrual phases.

However, other studies support the present findings, indicating that these factors do not always have a strong direct effect on performance outcomes. Research by Bruinvels (2020) and Ekenros (2022) suggests that athletes may adapt effectively to these symptoms, and that other factors such as motivation, training load, nutrition, and sleep may play a more dominant role in influencing performance.

### **Practical Implication**

Female athletes may be aware of their menstrual cycle at times having a better understanding of physiological responses and performance Adaptations impact their sporting unpredictability. Sufficient awareness will help a lot to assist the athlete to make decisions on training intensity, recovery strategies, and Overall Preperation. The coaches must not be too strict to organize training sessions in accordance with the periods of the menstrual cycle. There were no significant differences in objective performance. Instead, a better strategy for training is recommended, one that takes a custom-made strategy that takes each athlete's experiences and illnesses into account. and preparedness level. Also, all aspects must include fatigue, recovery, and well-being. Regularly observed as they assist with performance enhancement and reduction. Overtraining dangers the focus on flexibility and durability for athletes and sports coaches, and athletes can manage consistency and performance better.

### **Conclusions**

Based on the findings of the study, female athletes demonstrated a very high level of perceived training performance across the different phases of the menstrual cycle. The results indicate that athletes believe their performance in terms of strength, speed and agility, coordination, endurance, and power varies throughout the menstrual cycle. This suggests that female athletes are highly aware of changes in their physical condition during training and competition, which may be influenced by hormonal fluctuations and personal training experiences.

In terms of differences across menstrual cycle phases, the study revealed that there was no significant difference in perceived training performance. Although slight variations were observed, these differences were not statistically significant, indicating

that performance remains relatively stable regardless of menstrual phase. This implies that female athletes are generally able to maintain consistent training performance across all phases of their cycle.

Furthermore, the results showed that there was no significant relationship between perceived training performance and fatigue, recovery, and symptoms combined with performance influence. This suggests that these factors do not strongly predict or directly affect training performance in this study. It implies that other variables such as motivation, training load, nutrition, sleep quality, and individual adaptability may have a greater influence on athletic performance than menstrual-related symptoms alone.

### **Recommendations**

Based on the findings and the established conceptual framework, the following actions are recommended:

#### **1. Coaches and Trainers**

They may implement monitoring logs where athletes track their menstrual cycles together with daily fatigue levels and recovery status. This information can be used to adjust training intensity by scheduling more demanding workouts during the follicular phase and lighter or recovery-focused sessions during the luteal phase. Coaches may also establish open communication channels that encourage discussion of menstrual health as part of athletic performance, creating a supportive environment where athletes can openly share how they feel without fear of judgment.

#### **2. Student-Athletes**

They may practice self-regulation and improve their understanding of how the menstrual cycle affects performance. Athletes may be educated to identify their “power phases” where strength and energy levels are higher so they can maximize strength and high-intensity training during these periods. At the same time, they should prioritize active recovery strategies such as yoga, stretching, or mobility exercises during phases when fatigue is more likely, in order to better manage hormonal-related body changes.

#### **3. Western Mindanao State University Athletes**

The institution may strengthen awareness and integration of menstrual health in athlete support programs by providing educational seminars and performance monitoring systems that guide training adjustments based on individual athlete needs. In addition, facility and resource support may be enhanced by ensuring proper

ventilation, hydration access, and environmental conditions suitable for female athletes, especially during the luteal phase when body temperature is naturally higher.

#### 4. Future Researchers

it is recommended that expanded variables be considered, particularly examining the combined effects of nutrition, sleep, and menstrual cycle phases on recovery and performance, especially within the Philippine climate context. Future studies may also conduct longitudinal research across multiple seasons to determine whether aligning training programs with menstrual cycle phases can contribute to long-term injury prevention, such as reducing risks of ACL injuries among local female athletes

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