

ROLE OF DIET AND PHYSICAL ACTIVITY ON MENSTRUAL HEALTH

Selvakshmi S¹ Lakshmanan S²

Research Scholar ¹, Associate Professor ²

^{1,2} Department of Zoology, Poompuhar College (Autonomous), (Affiliated to Bharathidasan University),
Melaiyur, Sirkali Taluk, Mayiladuthurai, Tamilnadu, India

ORCID: 0009-0006-1145-2936

Corresponding author:

Email: slzooopompuhar@gmail.com

DOI: <https://doi.org/10.63001/tbs.2024.v19.i02.pp50-54>

KEYWORDS

Dysmenorrhea,
Premenstrual symptom,
Irregular menstrual cycle,
lifestyle pattern,
diet pattern

Received on:

05-04-2024

Accepted on:

26-08-2024

Corresponding author

ABSTRACT

Aim: The objective of the study was to determine the menstrual irregularities among adolescents, and their relationship to dietary and physical activity patterns.

Material and method: The cross-sectional survey was carried out in various college students. The questionnaires were designed based on socio-economic characteristics, diet and physical activity, and menstrual abnormalities.

Result: Prevalence of dysmenorrhea, and PMS were among adolescent Eating junk food and lack of physical activity was linked to dysmenorrhea (38.5 %) and PMS(45.4%)

Conclusion: Health education programs should focus on lifestyle changes such as physical activity, reducing junk food intake and encouraging healthy eating habits to promote menstrual health.

Early onset of puberty (Eckert-Lind, C., et al 2020) and the age of menarche (Nasiri S et al 2020) are affected by a variety of factors, including genetics (AH Duittoz et al 2023) (Wang, S et al 2023), ethnic origin, height and weight, BMI, and socio-economic background. (Gohlke B, Woelfle J (2009)) According to several studies, Early menarche (Shim, J.Y., Laufer, M.R. 2020) may be, the prevalence of obesity increases with the median age of women at menarche. (Kaplowitz PB (2008)) Secular patterns in puberty timing seem to persist, although malnutrition is no longer a factor in delaying puberty. Obesity and other environmental factors are now thought to be at play, with endocrine-disrupting chemicals (EDCs) also being mentioned. (Toppari, J., & Juul, A. (2010)). Adolescent girls are particularly prone to moderate levels of eating disorders due to their heightened sensitivity to body weight or excessive pursuit of thinness. (H. N. Madanat, R 2011) As a result of globalization, Indians are changing their diet and lifestyle. Many adolescent girls are changing their normal eating habits and adopting unhealthy eating habits. (S. K. Mishra and S. Mukhopadhyay). The eating habits of Greek adolescents are characterized by a

tendency to skip meals, snack, consume food away from home, consume fast food, and adhere to alternative dietary habits. (T. A. Nicklas, 1998) They become focused on and sensitive to changes in their body shape, size, and appearance. This heightened awareness has caused many to make dietary changes that could pose serious risks to psychosocial growth, nutrition, and the development of eating disorders. Factors such as the family environment. (D. Neumark-Sztainer et al 2007). The prevalence of menstrual disorders was high, with adverse consequences on their health and class attendance. (Odongo, E., et al 2023) Dietary fiber intake was negatively related to menstrual pain among young Japanese women. (Nagata C et al 2005). The prevalence of dysmenorrhoea symptoms among young women who do not consume breakfast is significantly higher than that of those who had (Smith S, Schiff I) Menstrual discomfort was linked to eating less than 2 servings of fruit daily. High and low adherence to the Mediterranean diet and reduced alcohol consumption were associated with shorter menstrual cycles. (Onieva-Zafra, M.D., et al 2020)

Material and method:

This study population comprised of 655 healthy unmarried adolescent girls aged 18-28 years who had experienced menstruation but had not given birth. Data collection was conducted through surveys employing a questionnaire that captured sociodemographic and menstruation-related variables. The questionnaire encompassed the subsequent information: Description of pain and symptoms linked to dysmenorrhea and premenstrual symptoms; Utilized medications for managing dysmenorrhea; Correlation between the severity of pain, such as menarche, and duration of the menstrual period; Severity of

pain, attributes of Menstrual flow and pain severity. Adolescents were asked about experiencing symptoms commonly associated with dysmenorrhea. Dysmenorrhea was characterized as 'experiencing painful menstruation in the last three months'. Premenstrual symptom characterized as experiencing pain, depression, mood swing before periods. **Statistical Analysis:** 255 adolescents data were complete. Incomplete data were eliminated. Data were collected and descriptive analysis and percentages were calculated by using SPSS 25.

Table 1: Socio-demographic characteristics of participants

| Variable | Frequency | Percentage(%) |
|------------|------------|---------------|
| Age | RESPONDENT | PERCENTAGE |
| 17-20 | 162 | 63.5 |
| 21-24 | 55 | 21.5 |
| 25-28 | 38 | 14.9 |
| Residence | | |
| Urban | 196 | 76.8 |
| Semi-Urban | 23 | 9.01 |
| Rural | 36 | 14.0 |

Table.2 Menstrual pattern and symptom

| Variable | frequency | percentage |
|---------------------------------|-----------|------------|
| Menarche | | |
| 9 - 12 | 213 | 83.5 |
| 13-16 | 42 | 16.4 |
| Normal cycle | | |
| Yes | 172 | 67.5 |
| No | 83 | 32.5 |
| Menstrual cycle length | | |
| <20 | 12 | 4.07 |
| 21-30 | 176 | 69.01 |
| >30 | 71 | 27.84 |
| Duration of the menstrual cycle | | |
| < 3 | 9 | 3.05 |
| 3-6 | 173 | 67.8 |
| 7 and above | 73 | 28.6 |
| Dysmenorrhea | | |
| Yes | 179 | 70.9 |
| No | 86 | 33.7 |
| PMS | | |
| Yes | 196 | 76.8 |
| No | 59 | 23.1 |
| Healthy eating | | |
| Yes | 89 | 34.9 |
| No | 166 | 65.9 |
| Fast food eating | | |
| Yes | 76 | 29.8 |
| No | 179 | 70.1 |
| Dieting (skipping food) | | |
| Yes | 98 | 38.4 |
| No | 157 | 61.5 |
| Exercise | | |
| Yes | 65 | 25.4 |
| No | 190 | 74.5 |

Table 3 lifestyle and menstrual pattern

| Lifestyle pattern | Irregular cycle (83) | | Dysmenorrheal (179) | | Premenstrual symptom (196) | |
|------------------------|----------------------|------|---------------------|------|----------------------------|------|
| | (N) | (%) | (N) | (%) | (N) | (%) |
| Junk food | | | | | | |
| Yes | 33 | 39.7 | 110 | 61.4 | 150 | 76.5 |
| No | 50 | 60.2 | 69 | 38.5 | 46 | 23.4 |
| Dieting(skipping food) | | | | | | |
| Yes | 65 | 78.3 | 69 | 38.5 | 89 | 45.4 |
| No | 23 | 27.7 | 110 | 61.4 | 107 | 54.5 |
| Exercise | | | | | | |
| Yes | 29 | 34.9 | 40 | 22.3 | 44 | 22.4 |

| | | | | | | |
|----|----|------|-----|------|-----|------|
| No | 64 | 77.1 | 139 | 77.6 | 155 | 79.0 |
|----|----|------|-----|------|-----|------|

Figure 1: Socio-demographic characteristics of participants

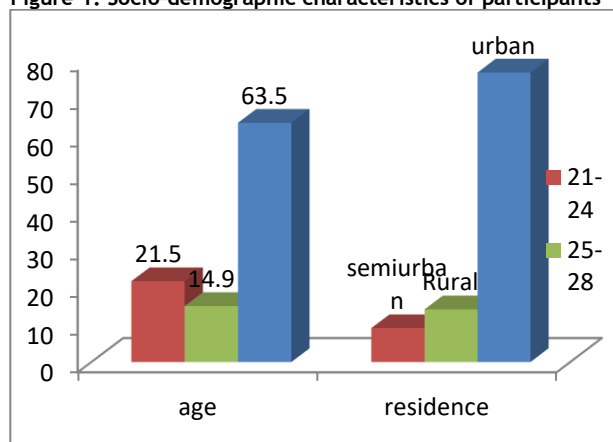
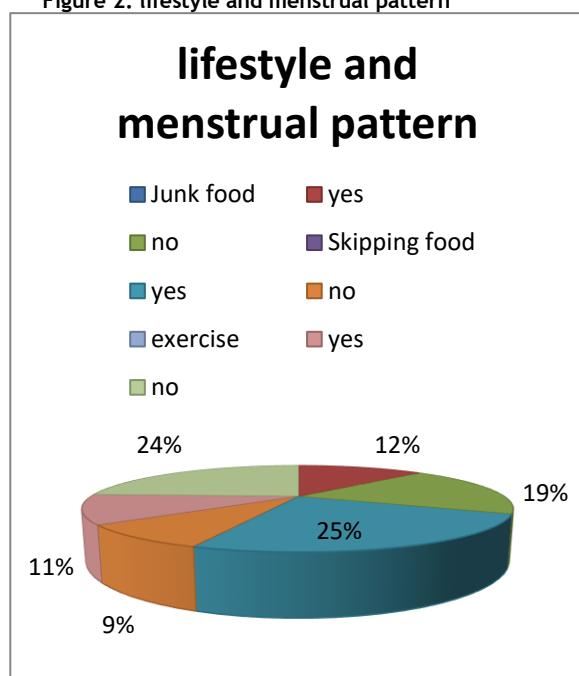


Figure 2: lifestyle and menstrual pattern



RESULTS AND DISCUSSION

In this study 76.8% of the participants were urban residents . In Nigeria (Ovuakporaye, S. I., et al 2023), India there were no variation in AAM (Khatoun, T et al 2011) Urban residents attained menarche earlier than rural residents. Studies were documented that sociodemographic condition, dietary pattern has a vital role, (K. Vlismas et al 2009), AAM is a indicator of socio economic changes (A. Papadimitriou 2016).(Table 2) Menarche age 83.5% of girls attained between (9-12years), similar studies also documented earlier in Thailand (P.Noipayak.P et al 2017),(O.Park et al 2021), India (Omidvar S et al 2018) (M. Žegleń et al 2020) ,Russia (Ponomarenko, E et a 2019),Italy (G.N. Piras et al 2020) Norway (M.S. Gottschalk et al 2020) and 16.2% of the participants attained menarche between 13-16 years, Previously research studies also China ,(W. Liu et al 2021) UK (M. Krzyżanowska et al 2016). And 67.5% of the respondent had normal menstrual cycle(Rathod, H., et al 2023) 32.5% of them had irregular cycle. Normal length cycle was about 69.01%, and 27.84 % respondent had abnormal length. 28.6% of the respondent had more than 7 days menstrual cycle. 70.9 % of the respondent have dysmenorrhea.(Rathod et al 2023) 29.8 % of the respondent have fast food eating, it affects our metabolism as well as mental health (Ertz and Le Bouhart, 2022). 61.5 % of the respondent were skipping their food. Most of the adolescence were not doing any kind of exercise, 74.5 % of the students were not doing exercise.76.8%

of the students had PMS . Those who were eating junk food they mostly had premenstrual symptom(76.5 %) and dysmenorrhea (61.4%) India(Negi P et al 2018) studies shows that lifestyle pattern , such as physical activity and eating pattern impede menstrual cycle. In previous studies , there were no connection eating junk food and menstrual disorders. (Sreelakshmi et al 2021) And the respondent who were in dieting or skipping food, they had irregular menstrual cycle(78.9%), (A. Monzani et al 2019).Most of the adolescent were not doing any exercise ,they also had irregular period(77.1) ,dysmenorrhea(77.6%) (Wang L et al 2022) in kuwait(86%) (Al-Matouq S et al 2019) in Egypt 76% and PMS (79 %).In previous studies in Iran (Taheri, R., et al 2023)prevalence of PMS among adolescent.. The causes of menstrual dysfunction are complex and involve a variety of factors, such as weight loss, body fat reduction, poor eating habits, physical activity, and stress. (Vyver, E., et al). In another study, it is evident that there is a profound connection between dietary intake and the menstrual cycle(Dars et al 2014.,)(Sasikala A et al.,2021) (Ravi et al 2016) Consumption of fast food were associated with menstrual abnormalities (Fitrianiingsih ADR). Early menarche was correlated with diabetes, heart disease.(Bubach, S. et al 2021). There is need of education about menstrual health(A. Randhawa, et al 2021) similar studies was conducted in UK.

CONCLUSION

This study shows more prevalence of PMS and dysmenorrhea among adolescents. These menstrual irregularity are correlated with dietary pattern and physical activity. Adolescents have to avoid eating junk food and sedentary lifestyle. Eating fibrous food, fruit and vegetable may help their menstrual health.

Acknowledgement:

We express our thanks to the management of Poopuhar college , (Autonomous), Mayiladurai for providing them necessary facilities and support to carry out this work.

REFERENCESINTRODUCTION

- Monzani, R. Ricotti, M. Caputo, *et al.*, A systematic review of the association of skipping breakfast with weight and cardiometabolic risk factors in children and adolescents. What should we better investigate in the future? *Nutrients*, 11 (2019), p. <https://doi.org/10.3390/nu1102038>
- Al-Matouq S, Al-Mutairi H, Al-Mutairi O, Abdulaziz F, Al-Basri D, Al-Enzi M, et al. Dysmenorrhea among high-school students and its associated factors in Kuwait. *BMC Pediatr.* 2019;19(1):80. doi: 10.1186/s12887-019-1442-6
- Ansong E, Arhin SK, Cai Y, Xu X, Wu X. Menstrual characteristics, disorders and associated risk factors among female international students in Zhejiang Province, China: A cross-sectional survey. *BMC Women's Health.* 2019;19(1):1-10. doi:10.1186/s12905-019-0730-5.
- Bakhshani N, Hasanzadeh Z, Raghbi M. Prevalence of premenstrual symptoms and premenstrual dysphoric disorder among adolescents students of Zahedan. *Zahedan J Res Med Sci.* 2012;13:29-34.
- Bubach, S., Horta, B. L., Gonçalves, H., & Assunção, M. C. F. (2021). Early age at menarche and metabolic cardiovascular risk factors: mediation by body composition in adulthood. *Scientific reports*, 11(1), 148. <https://doi.org/10.1038/s41598-020-80496-7>
- D. Neumark-Sztainer, M. E. Eisenberg, J. A. Fulkerson, M. Story, and N. I. Larson, "Family meals and disordered eating in adolescents: longitudinal findings from Project EAT," *Archives of Pediatrics and Adolescent Medicine*, vol. 162, no. 1, pp. 17-22, 2008.
- Dars S, Sayed K, Yousufzai Z. Relationship of menstrual irregularities to BMI and nutritional status in adolescent girls. *Pak J Med Sci.* 2014;30:140-4
- Eckert-Lind, C., Busch, A. S., Petersen, J. H., Biro, F. M., Butler, G., Brauner, E. V., & Juul, A. (2020). Worldwide secular trends in age at pubertal onset

- assessed by breast development among girls: a systematic review and meta-analysis. *JAMA pediatrics*, 174(4), e195881-e195881. <https://doi.org/10.1001/jamapediatrics.2019.5881>
- Fitrianiingsih ADR, Santanu AM. Primary Dysmenorrhea Risk Based on Characteristics, Dietary Habits, and Types of Exercise. *J Inform Know Manag*. 2021;12(1):21-37. doi:10.26553/jikm.2021.12.1.21-37
 - G.N. Piras, M. Bozzola, L. Bianchin, S. Bernasconi, G. Bona, G. Lorenzoni, et al.
 - Gohlke B, Woelfle J (2009) Growth and puberty in German children: is there still a positive secular trend? *Dtsch Arztebl Int* 106: 377-382.
 - Gutman G, Nunez AT, Fisher M. Dysmenorrhea in adolescents. *Curr Probl Pediatr Adolesc Health Care*. 2022;52(5):101186. <https://doi.org/10.1016/j.cppeds.2022.101186>
 - H. N. Madanat, R. Lindsay, and T. Campbell, "Young urban women and the nutrition transition in Jordan," *Public Health Nutrition*, vol. 14, no. 4, pp. 599-604, 2011. *Heliyon*, 6 (2020), <https://doi.org/10.1016/j.heliyon.2020.e04222>
 - J. Shim, M. Laufer, Adolescent Endometriosis: An Update, *Journal of Pediatric and Adolescent Gynecology*, 33 (2) (2020), pp. 112-119 <https://doi.org/10.1016/j.jpjag.2019.11.011>
 - K. Vlismas, V. Stavrinou, D.B. Panagiotakos, Socio-economic status, dietary habits and health-related outcomes in various parts of the world: a review, *Cent Eur J Public Health*, 17 (2009), pp. 55-63 <https://doi.org/10.21101/cejph.a3475>
 - Kaplowitz PB (2008) Link between body fat and the timing of puberty. *Pediatrics* 121 Suppl 3S208-S217.
 - Khatoon, T., Verma, A. K., Kumari, R., Rupani, R., Singh, M. and Rizvi, A. Age at menarche and affecting Bio-Social factors among the girls of Lucknow, Uttar Pradesh. *J Indian Acad Forensic Med*. 2011, 3(33), p. 221.
 - Lghoul S, Loukid M, Hilali MK. Prevalence and predictors of dysmenorrhea among a population of adolescent's schoolgirls (Morocco). *Saudi J Biol Sci*. 2020;27(7):1737-42.
 - M. Krzyżanowska, C.G. Mascie-Taylor, J.C. Thalabard., Biosocial correlates of age at menarche in a British cohort., *Ann Hum Biol*, 43 (2016), pp. 235-240 <https://doi.org/10.3109/03014460.2015.1059890>
 - M. Żegleń, E. Marini, S. Cabras, Ł. Kryst, R. Das, A. Chakraborty, et al. The relationship among the age at menarche, anthropometric characteristics, and socio-economic factors in Bengali girls from Kolkata, India., *Am J Hum Biol*, 32 (2020), Article e23380. <https://doi.org/10.1002/ajhb.23380>
 - M.S. Gottschalk, A. Eskild, S. Hofvind, J.M. Gran, E.K. Bjelland, Temporal trends in age at menarche and age at menopause: a population study of 312 656 women in Norway, *Hum Reprod*, 35 (2020), pp. 464-471 <https://doi.org/10.1093/humrep/dez288>
 - Myriam Ertz Guillaume Le Bouhart The Other Pandemic: A Conceptual Framework and Future Research Directions of Junk Food Marketing to Children and Childhood Obesity., <https://doi.org/10.1177/02761467211054354>
 - Nagata C, Hirokawa K, Shimizu N, Shimizu H. Associations of menstrual pain with intakes of soy, fat and dietary fiber in Japanese women. *Eur J Clin Nutr*. 2005;59:88-92.
 - Nasiri, S., Dolatian, M., Ramezani Tehrani, F., Alavi Majd, H., Bagheri, A., & Malekifar, P. (2020). Factors related to the age at menarche in Iran: A systematic review and meta-analysis *International Journal of Pediatrics*, 8(9), 12091-12104. <https://doi.org/10.22038/ijp.2020.49222.3939>
 - Negi P, Mishra A, Lakhera P. Menstrual abnormalities and their association with lifestyle pattern in adolescent girls of Garhwal, India. *J Family Med Prim Care*. 2018;7(4):804-808. doi:10.4103/jfmpc.jfmpc_159_17
 - Odongo, E., Byamugisha, J., Ajeani, J. et al. Prevalence and effects of menstrual disorders on quality of life of female undergraduate students in Makerere University College of health sciences, a cross sectional survey. *BMC Women's Health* 23, 152 (2023). <https://doi.org/10.1186/s12905-023-02290-7>
 - Omidvar, S., Amiri, F. N., Bakhtiari, A., & Begum, K. (2018). A study on menstruation of Indian adolescent girls in an urban area of South India. *Journal of family medicine and primary care*, 7(4), 698.
 - Onieva-Zafra, M.D., Fernández-Martínez, E., Abreu-Sánchez, A., Iglesias-López, M.T., García-Padilla, F.M., Pedregal-González, M., Parra-Fernández, M.L., 2020. Relationship between Diet, Menstrual Pain and other Menstrual Characteristics among Spanish Students. *Nutrients* 12, 1759.. <https://doi.org/10.3390/nu12061759>
 - Ovuakporaye, S. I., Nwangwa, E. K., OJI, B. N., NWAObuoku, S. U., & Onobrakpeya, A. (2023). Variations in the age of onset of menarche among inhabitants of rural and urban areas in delta state south-south Nigeria. *World Journal of Biology Pharmacy and Health Sciences*, 14(1), 168-175. <https://doi.org/10.30574/wjbps.2023.14.1.0163>
 - P. Noipayak, P. Rawdaree, B. Supawattanabodee, et al. Factors associated with early age at menarche among Thai adolescents in Bangkok: a cross-sectional study *BMC Women Health*, 17 (2017), p. 16, 10.1186/s12905-017-0371-5
 - Park, O., Park, J. T., Chi, Y., & Kwak, K. (2021). Association of phthalates and early menarche in Korean adolescent girls from Korean National Environmental Health Survey (KoNEHS) 2015-2017. *Annals of Occupational and Environmental Medicine*, 33. <https://doi.org/10.35371/aoem.2021.33.e4>
 - Ponomarenko, E. Reshetnikov, O. Altuchova, A. Polonikov, I. Sorokina, A. Yermachenko, et al., Association of genetic polymorphisms with age at menarche in Russian women, *Gene* 686 (2019 Feb 20) 228-236.
 - Randhawa, A. Tufte-Hewett, A. Weckesser, G. Jones, F. Hewett, Secondary school girls' experiences of menstruation and awareness of endometriosis: A cross-sectional study, *Journal of Pediatric and Adolescent Gynecology*, 34 (5) (2021), pp. 643-648 <https://doi.org/10.1016/j.jpjag.2021.01.021>
 - Rathod, H., Rathi, S., Tiwari, S., & Borgaonkar, C. (2023). Study of Menstrual Patterns, Abnormalities, and Irregularities in Students. *Cureus*, 15(6): <https://doi.org/10.7759/cureus.40206>
 - Ravi R, Shah P, Palani G, et al. Prevalence of menstrual problems among adolescent school girls in rural Tamil Nadu. *Journal of Pediatric & Adolescent Gynecology* 2016; 29(6):571-6.
 - S. K. Mishra and S. Mukhopadhyay, "Eating and weight concerns among Sikkimese adolescent girls and their biocultural correlates: An exploratory study," *Public Health Nutrition*, vol. 14, no. 5, pp. 853-859, 2010.
 - Sasikala A. Assess the prevalence and factors related to menstrual disorders among adolescent girls. *TNNMC J Obstet Gynaecol Nurs*. 2021;9(2):8-12.
 - Smith S, Schiff I. The premenstrual syndrome; Diagnosis and management. *Fertil Steril*. 1989;52:527-43.

- Sreelakshmi U, Tushara BV, Subhashini T, Saritha K. Impact of dietary and lifestyle choices on menstrual patterns in medical students. *Int J Reprod Contraception Obstet Gynecol Sci.* 2019;8(4):1271-1276. <https://doi.org/10.18203/2320-1770.ijrco20190980>
- T. A. Nicklas, L. Myers, C. Reger, B. Beech, and G. S. Berenson, "Impact of breakfast consumption on nutritional adequacy of the diets of young adults in Bogalusa, Louisiana: ethnic and gender contrasts," *Journal of the American Dietetic Association*, vol. 98, no. 12, pp. 1432-1438, 1998.
- Taheri, R., ZareMehrdardi, F., Heidarzadeh-Esfahani, N., Hughes, J. A., Reid, R. E., Borghei, M., & Shahraki, H. R. (2023). Dietary intake of micronutrients are predictor of premenstrual syndrome, a machine learning method. *Clinical Nutrition ESPEN*, 55, 136-143. [10.1016/j.clnesp.2023.02.011](https://doi.org/10.1016/j.clnesp.2023.02.011)
- Toppari, J., & Juul, A. (2010). Trends in puberty timing in humans and environmental modifiers. *Molecular and cellular endocrinology*, 324(1-2), 39-44. <https://doi.org/10.1016/j.mce.2010.03.011>
- W. Liu, X. Yan, C. Li, Q. Shu, M. Chen, L. Cai, *et al.* A secular trend in age at menarche in Yunnan Province, China: a multiethnic population study of 1,275,000 women, *BMC Public Health*, 21 (2021), p. 1890, <https://doi.org/10.1186/s12889-021-11951-x>
- Wang L, Yan Y, Qiu H, Xu D, Zhu J, Liu J *et al.* Prevalence and risk factors of primary dysmenorrhea in students: a meta-analysis. *Value in Health*. 2022.
- Wang, S., Fang, J., Li, J., Wang, S., Su, P., Wan, Y., ... & Sun, Y. (2023). Identification of urine biomarkers associated with early puberty in children: An untargeted metabolomics analysis. *Physiology & Behavior*, 114305.
- Xing, W., Lv, Q., Li, Y., Wang, C., Mao, Z., Li, Y., ... & Li, L. (2023). Genetic prediction of age at menarche, age at natural menopause and type 2 diabetes: A Mendelian randomization study. *Nutrition, Metabolism and Cardiovascular Diseases*, 33(4), 873-882.