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INNOVATIVE SHOES WITH HIGH CONSUMER PROPERTIES FOR PREGNANT WOMEN

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Annotation: This article examines innovative shoes designed specifically for pregnant women, focusing on their ergonomic comfort, functional features, and high consumer properties. The study analyzes footwear materials, sole construction, shock absorption, and design elements, evaluating their impact on daily walking comfort, foot health, and joint support during pregnancy. The results demonstrate that these shoes effectively combine ergonomic and hygienic benefits with modern design, ensuring comfort, safety, and satisfaction for pregnant women.
Key words. Pregnancy, innovative footwear, ergonomic comfort, consumer properties, foot health.

Introduction. Pregnancy is a critical period in a woman's life, characterized by substantial physiological and anatomical changes that affect mobility, posture, and overall comfort. During this time, increased weight, swelling, and changes in foot structure can lead to discomfort, fatigue, and musculoskeletal strain, making the selection of appropriate footwear essential not only for aesthetics but also for health and daily functional support. Modern footwear design for pregnant women aims to address these challenges by integrating ergonomic principles, innovative materials, and functional design elements that enhance comfort, stability, and safety. Lightweight, shock-absorbing insoles, breathable and flexible upper materials, and hygienic inner linings are key features that collectively improve foot health and walking efficiency while preventing irritation and discomfort. Additionally, the aesthetic appeal of footwear plays a significant role in consumer satisfaction, as pregnant women seek products that are both functional and visually appealing. The research evaluates material quality, sole construction, shock absorption, ergonomic fit, and design elements, as well as their impact on comfort, foot support, joint load, and overall user satisfaction. By examining these factors through both objective measurements and subjective assessments, the study aims to provide a comprehensive understanding of how innovative footwear can enhance daily mobility, ensure foot health, and satisfy the practical and aesthetic preferences of pregnant women.
Furthermore, the introduction establishes the relevance and significance of this research by highlighting the practical implications for product development, market competitiveness, and improving quality of life for expectant mothers, thereby providing a solid foundation for subsequent analysis and discussion. In addition to addressing basic comfort and health requirements, modern maternity footwear must also consider the evolving lifestyle and activity levels of pregnant women. Daily activities such as walking, standing for extended periods, and performing household or occupational tasks place increased demands on the feet and lower limbs, which can exacerbate discomfort and fatigue if footwear is inadequate. Research has shown that poorly designed shoes during pregnancy may contribute to musculoskeletal pain, postural imbalance, and long-term foot problems, highlighting the importance of ergonomic and

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supportive design. Innovative materials, including memory-foam, EVA, and elastic breathable textiles, provide both adaptability and cushioning, while antibacterial linings and moisture-wicking properties maintain foot hygiene and prevent skin irritation. Moreover, aesthetics plays a key role in consumer satisfaction, as pregnant women seek products that allow them to maintain style and personal expression without compromising comfort or safety. By combining laboratory material testing, biomechanical analysis, and subjective user assessments, the research provides a comprehensive understanding of how high-quality maternity footwear can improve daily mobility, reduce physiological stress, and meet the expectations of modern consumers. The introduction establishes the necessity of evaluating both functional and aesthetic dimensions, demonstrating that innovative maternity footwear can have a meaningful impact on the health, well-being, and confidence of pregnant women, thereby laying the groundwork for the detailed analysis presented in subsequent sections.

Literature review. Recent studies on footwear for pregnant women emphasize the critical role of ergonomic design, material quality, functionality, and aesthetic appeal in ensuring comfort and supporting foot health throughout pregnancy [1]. Researchers have noted that pregnancy increases mechanical stress on the feet, leading to swelling, fatigue, and discomfort, which underscores the need for specialized footwear that accommodates these physiological changes [2]. Global research highlights that key characteristics of pregnancy footwear include lightweight and shock-absorbing soles, breathable and flexible upper materials, and hygienic inner linings, which collectively contribute to safer and more comfortable daily mobility [3]. Material science studies indicate that natural leather, antibacterial coatings, and elastic textile fibers used in footwear production are highly effective in enhancing comfort, reducing irritation, and maintaining foot hygiene during pregnancy [4]. Design-focused investigations emphasize that pregnant women place significant importance on the combination of aesthetics and functionality, requiring manufacturers to integrate ergonomic shape with appealing design features [5]. Market analyses in light industry demonstrate that innovative technologies, such as memory-foam inserts, EVA soles, and anti-slip materials, play a key role in improving the safety, comfort, and overall usability of footwear for pregnant women [6]. Additionally, consumer behavior studies confirm that pregnant women prefer footwear that provides both health benefits and modern design appeal, highlighting the importance of addressing both ergonomic and aesthetic aspects in product development [7]. Together, these studies provide a comprehensive understanding of the essential factors in designing and producing footwear for pregnant women, including material selection, sole construction, ergonomics, hygiene, aesthetics, and consumer satisfaction, forming the foundation for further empirical research and product innovation.

Research on specialized footwear for pregnant women emphasizes the importance of combining ergonomic design, high-quality materials, functional features, and aesthetic appeal to ensure comfort and foot health during pregnancy. Pregnancy causes significant physiological changes, including increased load on the feet, swelling, fatigue, and altered gait, which can lead to discomfort and musculoskeletal strain if inappropriate footwear is worn. Effective footwear must therefore provide proper arch support, evenly distribute pressure, and adapt to the changing shape of the feet throughout pregnancy. Materials such as memory-foam and EVA are commonly used for insoles due to their shock-absorbing properties and adaptability, while elastic and breathable upper materials reduce sweating and irritation, contributing to overall comfort.

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Antibacterial linings enhance hygiene and prevent microbial growth, ensuring long-term usability. Aesthetic considerations are also critical, as pregnant women seek shoes that are visually appealing in addition to being functional. Design integration that combines ergonomic, hygienic, and visual elements enhances user satisfaction and encourages consistent use. Additionally, innovative technologies and manufacturing methods, including flexible sole construction and anti-slip features, play a significant role in safety and stability, reducing the risk of falls or injuries. Overall, a comprehensive approach that addresses material performance, ergonomic support, hygiene, aesthetics, and user preferences is essential in developing effective footwear for pregnant women, ensuring both physical well-being and consumer satisfaction.

Research methodology. The research methodology of this study is focused on evaluating the ergonomic comfort, functional properties, material quality, and aesthetic appeal of specialized footwear designed for pregnant women by "NEW STAR." The study employed a combination of qualitative and quantitative research methods to obtain comprehensive insights into product performance and user satisfaction. In the materials analysis, the upper components of the shoes were examined for elasticity, breathability, durability, and moisture absorption using laboratory tests, while the sole materials, including EVA and memory-foam inserts, were assessed for shock absorption, pressure distribution, and adaptability to foot shape through biomechanical measurements. The practical assessment involved a sample of 50 pregnant women who tested the footwear in daily walking conditions. Data collection included structured questionnaires, Likert-scale surveys, observational logs, and biomechanical monitoring to evaluate comfort, foot support, joint load, and overall usability. Design assessment was conducted by expert evaluators to analyze ergonomic shape, aesthetic elements, and compatibility with user preferences. Data analysis incorporated statistical techniques, including mean values, percentage calculations, comparative analysis, and graphical representation to identify patterns and validate findings. This methodology allowed for an integrated evaluation of material performance, ergonomic suitability, and design effectiveness, providing scientifically grounded conclusions on the shoes' capacity to meet the needs of pregnant women in terms of comfort, safety, and style.

1-Table. Key Functional and material features of specialized footwear for pregnant women

Feature type	Technical/functional description	Research findings / benefits
Insole material	Eva and memory-foam	Absorbs shock, adapts to foot shape, reduces swelling and fatigue
Upper material	Elastic and breathable textile	Minimizes sweating and irritation, conforms to foot movement
Inner lining	Antibacterial coating	Ensures hygiene, reduces odor and microbial growth
Orthopedic comfort	Insole and design adaptability	Reduces excessive load on foot muscles and joints
Design	Ergonomic and aesthetic	Matches pregnant women's preferences, enhances daily walking comfort

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The two tables provide a systematic overview of the key features and user evaluations of specialized footwear designed for pregnant women by "NEW STAR." Table 1 summarizes the functional and material characteristics, highlighting the use of EVA and memory-foam insoles for effective shock absorption and adaptability to foot shape, which reduces swelling and fatigue. The upper materials, made of elastic and breathable textiles, contribute to comfort by minimizing sweating and skin irritation, while the antibacterial inner lining ensures hygiene and reduces microbial growth. Orthopedic design elements distribute pressure evenly across the foot, supporting muscles and joints, and the overall design combines ergonomic functionality with aesthetic appeal suitable for pregnant women.

2-Table. User evaluation of specialized footwear for pregnant women

Evaluation criterion	Scale / measurement	User feedback / results
Comfort	Likert scale 1–5	Average rating 4.7 – high comfort during daily walking
Foot support	Observation and biomechanical analysis	Even pressure distribution, reduced joint strain
Shock absorption	Laboratory and user test	High effectiveness in reducing foot fatigue
Breathability	Subjective feedback	Users reported minimal sweating and skin irritation
Overall satisfaction	Likert scale 1–5	Average rating 4.8 – strong acceptance and preference

Table presents the results of user evaluations, demonstrating high levels of comfort, foot support, and overall satisfaction, as measured through Likert-scale surveys, observational monitoring, and biomechanical analysis. Users reported that the shoes significantly reduced foot fatigue and strain, provided stable support during daily walking, and maintained hygiene and breathability throughout use. Together, these tables validate that the footwear effectively integrates material quality, ergonomic design, and aesthetic considerations, meeting the practical, health, and consumer preference needs of pregnant women, while providing valuable insights for further product development and market positioning.

Research discussion. The research discussion highlights the significant findings regarding the specialized footwear designed for pregnant women by "NEW STAR," demonstrating how ergonomic design, material selection, and aesthetic features collectively contribute to high consumer satisfaction and functional performance. The study revealed that the use of memory-foam and EVA insoles effectively absorbs shock and adapts to foot shape, reducing swelling, fatigue, and discomfort during walking, which confirms the importance of advanced material technology in enhancing foot health and overall comfort. Participants reported that the elastic and breathable upper materials minimized sweating and skin irritation, while the antibacterial inner lining-maintained hygiene, indicating that material properties directly impact user experience and satisfaction. Expert evaluations of the design confirmed that the shoes combine

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ergonomic form with modern aesthetics, meeting both functional and visual expectations of pregnant women. The results also showed that the footwear provides stable support for joints and evenly distributes pressure across the foot, which is critical for preventing musculoskeletal strain during pregnancy. Furthermore, the positive feedback on long-term usability, anti-slip features, and price-to-quality ratio highlights the shoes' competitive advantage in the market and their potential to satisfy consumer demands. The discussion underscores the integration of ergonomic, hygienic, and aesthetic considerations as essential in the development of footwear for pregnant women, demonstrating that innovative material use, carefully engineered sole construction, and appealing design collectively enhance both health outcomes and user satisfaction.

Participants reported improvements in walking efficiency and overall mobility, confirming that ergonomic design and material selection directly influence user experience. The elastic and breathable upper materials contributed to thermal comfort and reduced irritation, while the antibacterial lining-maintained hygiene, highlighting the importance of integrating both functional and health-related features in footwear design. Design evaluations indicated that the shoes successfully balance ergonomic functionality with modern aesthetics, ensuring that user preferences for style are not compromised by comfort or support needs. The study also revealed that footwear with anti-slip soles and adequate joint support can prevent injuries and enhance stability, which is particularly important given the increased risk of falls during pregnancy. Furthermore, user feedback and observational data suggest that consistent daily use of these shoes contributes to long-term foot health, alleviating musculoskeletal strain and promoting overall well-being. The discussion underscores that innovative material usage, carefully engineered sole construction, and attention to aesthetic and ergonomic details are essential for creating high-quality footwear for pregnant women. Overall, the discussion confirms that specialized footwear can significantly improve quality of life for expectant mothers by addressing both physiological and psychosocial aspects of comfort, thereby establishing a benchmark for future research and innovation in maternity footwear.

Conclusion. The conclusion of this study demonstrates that the specialized footwear developed by "NEW STAR" for pregnant women effectively combines ergonomic comfort, functional performance, hygienic safety, and modern aesthetic appeal. The research findings confirm that memory-foam and EVA insoles provide significant shock absorption and adapt to foot shape, reducing swelling, fatigue, and musculoskeletal strain, while the elastic and breathable upper materials, along with the antibacterial inner lining, ensure hygiene and minimize discomfort. Expert assessments indicate that the design harmoniously integrates ergonomic functionality with visual appeal, satisfying both health and aesthetic needs of pregnant women. The footwear also provides stable joint support, evenly distributes pressure across the foot, and is suitable for long-term daily use, which collectively enhances comfort and overall well-being during pregnancy. Additionally, the positive evaluations regarding anti-slip features and the price-to-quality ratio indicate strong market competitiveness and high consumer acceptance. In summary, "NEW STAR" footwear successfully addresses the practical, ergonomic, and aesthetic requirements of pregnant women, improving their mobility, comfort, and health outcomes, while offering insights and recommendations for manufacturers to develop innovative, high-quality products that meet the unique needs of this consumer segment.

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