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Research Article

Pediatric Foot Orthopedics in Low-Income Neighborhoods: A Communication Based Approach to Counteracting Shoe Poverty

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Abstract: Footwear plays a pivotal role in shaping pediatric foot structure, functional gait patterns, and long-term musculoskeletal outcomes, yet it remains underexamined in public health and pediatric orthopedic literature. Children living in low-income neighborhoods face structural barriers that limit access to properly fitting footwear, including financial constraints, restricted retail availability, and limited caregiver awareness of pediatric shoe-fit principles. As a result, many children wear shoes that are too small, too narrow, or structurally inadequate, exposing them to chronic biomechanical stress during critical phases of musculoskeletal development. This narrative review synthesizes existing evidence on footwear fit, pediatric foot morphology, gait biomechanics, and socioeconomic determinants of footwear access. It integrates theoretical perspectives from the Social-Ecological Model and the Life-Course Health Development framework to conceptualize shoe poverty as a multilevel, developmentally sensitive determinant of pediatric orthopedic outcomes. A communication-centered clinical model is presented that emphasizes empathetic inquiry, objective shoe-fit assessment, growth-informed education, and connection to community-based resources. The review concludes by outlining a comprehensive research agenda and highlighting the need for coordinated efforts among clinicians, educators, policymakers, and public health systems to reduce pediatric orthopedic inequities associated with shoe poverty.

Keywords: Pediatric orthopedics, footwear, low-income populations, communication, social determinants of health, foot deformities.

Introduction

1. The Critical Role of Footwear in Pediatric Development

The pediatric foot undergoes rapid morphological and functional change throughout childhood. Because it is composed of a high proportion of cartilage and pliable tissue, it is especially susceptible to external compression and biomechanical alterations [1,2]. Ill-fitting footwear has been shown to restrict toe splay, elevate plantar pressure in anatomically vulnerable regions, alter natural gait patterns, and contribute to digital deformities and discomfort [3-5]. These effects are often compounded because children may normalize discomfort or lack the language to describe structural pressure or pain. Research consistently demonstrates that improperly fitted footwear is highly prevalent in childhood and influences both immediate function and long-term musculoskeletal health [6].

2. Shoe Poverty as a Public Health Inequity

Shoe poverty refers to chronic reliance on footwear that is too small, too narrow, worn out, or structurally inadequate due to financial strain or limited retail availability. Families living in low-income neighborhoods often face multiple constraints, including rapid child growth, competing financial priorities, and geographical barriers to purchasing appropriately sized footwear [7,8]. Because shoes are not traditionally conceptualized as health-related necessities, footwear inadequacy remains largely invisible within pediatric assessments despite its biomechanical impact.

3. Musculoskeletal Inequities and Delayed Care

Socioeconomic disadvantage shapes access to pediatric orthopedic evaluation and early intervention. Children from low-income households experience delays in assessment of gait abnormalities, toe deformities, flatfoot progression, and pain, often due to insurance limitations, transportation barriers, or reduced availability of specialty care [9,10]. When shoe poverty coexists with reduced access to clinical evaluation, structural abnormalities may progress during sensitive developmental periods.

4. Objective of the Review

This review synthesizes evidence on footwear fit, pediatric foot development, and socioeconomic determinants of shoe access. It introduces a communication-centered clinical framework and expands theoretical, biomechanical, and research perspectives on shoe poverty as a developmental risk factor.

5. Theoretical Framework: A Social-Ecological and Life-Course Perspective

Shoe poverty can be conceptualized within the Social-Ecological Model, which positions health outcomes as the product of interactions across individual, family, community, and policy levels. At the individual level, ill-fitting footwear exerts direct biomechanical effects on developing feet. At the family level, financial hardship constrains purchasing frequency and quality. At the community level, neighborhoods may lack stores offering a full range of children's sizes or widths, creating footwear deserts. At the societal level, broader economic policies and material hardship shape families' access to necessities. Complementing this model is the Life-Course Health Development framework, which emphasizes that exposures during sensitive developmental windows can produce long-term structural and functional patterns. Footwear that restricts natural foot mechanics during periods of rapid growth may influence bone alignment, soft tissue adaptation, and neuromuscular control across the lifespan. Together, these frameworks underscore that shoe poverty is a multilevel, time-sensitive determinant of orthopedic health that requires early, system-wide intervention.

Materials and Methods

1. Search Strategy

A targeted literature search was conducted using PubMed, Scopus, Web of Science, and Google Scholar. Search terms included pediatric footwear, shoe fit, foot morphology, socioeconomic determinants, gait biomechanics, public health, and pediatric orthopedic disparities.

2. Selection Criteria

Peer-reviewed studies examining footwear adequacy, foot morphology, gait biomechanics, access barriers, and socioeconomic influences on footwear use in children aged 0 to 18 were included. Adult-exclusive studies and non-peer-reviewed sources were excluded.

3. Synthesis Approach

A narrative synthesis strategy allowed integration of clinical, biomechanical, sociological, and public health perspectives into a cohesive conceptual model.

Results

1. Prevalence of Ill-Fitting Footwear

Several studies demonstrate that ill-fitting footwear is widespread among children. Breet and Venter found that the majority of schoolchildren wore shoes that were either too short or too narrow [1]. A systematic review by Buldt and Menz reported a similarly high mismatch between foot and shoe dimensions across multiple pediatric populations [6]. Morrison et al. emphasized that inappropriate footwear is a global issue affecting children across socioeconomic levels, but disproportionately among those with limited resources [11]. Preschool studies show that both length and width mismatches correlate with changes in foot structure [2]. Together, these findings indicate that ill-fitting shoes represent a pervasive and underrecognized problem.

2. Biomechanical and Developmental Consequences

2.1. Gait Alterations

Poorly fitted footwear restricts natural foot motion, reduces stride length, and alters ankle and subtalar mechanics [12]. Wang et al. found that children's footwear significantly influences gait velocity, foot strike patterns, and joint range of motion, emphasizing the sensitivity of the developing foot–ankle complex [13].

2.2. Foot Morphology Changes

Narrow or tight shoes can alter toe alignment, compress soft tissues, and disrupt arch development. Puszczalowska-Lizis et al. demonstrated that inadequate footwear width and length contribute to functional excess or deficiency, which are associated with altered arch height and digital deformities [2]. Persistent compression is linked to early hallux valgus tendencies and altered heel positioning [3].

2.3. Long-Term Developmental Effects

Chronic exposure to ill-fitting footwear during key developmental windows may influence lifelong orthopedic patterns, contributing to adult foot pain, deformity, and compensatory lower-limb mechanics.

3. Socioeconomic Barriers to Footwear Access

3.1. Financial Hardship

Tora et al. found that household income significantly predicts footwear consistency among school-age children, underscoring the direct influence of poverty on shoe access [8]. Families may delay replacement because shoes are treated as optional rather than medical necessities.

3.2. Retail Availability and Footwear Deserts

Low-income neighborhoods often lack shoe stores offering wide widths, half sizes, or supportive footwear. Morrison et al. highlighted that footwear environments vary significantly by socioeconomic context, contributing to structural inequities [11].

3.3. Transportation and Time Constraints

Even when adequate footwear is available elsewhere, limited transportation access and constrained caregiver schedules restrict purchasing opportunities.

3.4. Psychosocial Dimensions

Children may minimize discomfort to avoid burdening caregivers. Qualitative studies suggest children's footwear choices are influenced by their environment, social norms, and available options, which may mask structural barriers [14].

4. Orthopedic Inequities Related to Poverty

Children from low-income households experience delayed access to specialty care due to insurance limitations, transportation barriers, and competing stressors [9,10]. When combined with chronic exposure to restrictive footwear, musculoskeletal risks intensify.

5. Mechanisms Linking Shoe Poverty to Orthopedic Outcomes

Shoe poverty influences pediatric foot health through interconnected biomechanical, sensory, muscular, behavioral, and healthcare access mechanisms. Restrictive shoes limit toe splay and increase local plantar pressures, contributing to digital deformities, early hallux valgus tendencies, and altered load distribution. Reduced plantar sensory feedback may alter balance and coordination, influencing gait and increasing reliance on proximal joints. Confined toe boxes reduce intrinsic muscle activation, impairing arch development and dynamic stability. Discomfort may lead children to avoid physical activity, affecting strength, motor skill acquisition, and psychosocial participation. Finally, financial hardship can delay orthopedic assessment, allowing minor deformities to progress into more complex problems.

Discussion

1. Shoe Poverty as a Structural Determinant

Shoe poverty reflects multilevel disadvantage. It emerges from limited household resources, constrained neighborhood retail environments, and policy-level economic inequities. Because the pediatric foot is sensitive to external pressures, structural deprivation has significant developmental consequences.

2. Communication as a Clinical Strategy

Clinicians can identify footwear inadequacies through routine history-taking by asking about replacement frequency, discomfort, or difficulty finding sizes. Observational inspection of shoes and gait alongside objective foot-shoe measurement enhances diagnostic accuracy and enables supportive, non-stigmatizing conversations.

3. Growth-Aware and Culturally Responsive Education

Caregivers often underestimate growth velocity or the importance of width-fit. Growth-focused counseling paired with demonstrations of toe allowance and plantar comfort helps families make informed decisions. Addressing cultural practices such as hand-me-down use with sensitivitystrengthens caregiver engagement.

4. Community Partnerships

Partnerships with schools, community health centers, nonprofits, and local retailers expand footwear access. Schools can conduct annual shoe-fit screenings, maintain shoe banks, and integrate footwear topics into wellness curricula. Community health workers can assist with resource navigation and home-based observation.

5. Policy Implications

Policymakers can support footwear voucher programs, incentivize businesses carrying anatomically appropriate footwear, integrate footwear access into material hardship indicators, fund research, and address transportation inequities that limit access to retail environments.

6. Stakeholder-Specific Interventions

Clinicians serve as the primary point of detection by integrating footwear assessments into routine care and maintaining up-to-date knowledge of community resources. Schools can observe footwear daily, conduct screenings, and support students through shoe banks and health curricula. Policymakers can implement voucher systems, incentivize retail diversity, and incorporate footwear adequacy into public health assessments. Together, these interventions create a coordinated response targeting the multiple levels at which shoe poverty operates.

7. Expanded Future Research Directions

Future research must quantify shoe poverty across urban and rural low-income settings using large-scale epidemiologic studies. Longitudinal biomechanical research is required to examine how chronic exposure to restrictive shoes influences arch development, gait mechanics, and alignment into adolescence. Qualitative and behavioral studies should explore children's experiences with footwear, activity avoidance due to pain, and psychosocial effects. Implementation-science research can test communication-centered protocols and their impact on early detection. Community-based research should evaluate school shoe banks, donation programs, and retail partnerships. Geospatial mapping studies can identify footwear deserts. Economic modeling can estimate potential healthcare cost savings of subsidizing footwear as an orthopedic prevention strategy.

Conclusion

Shoe poverty is an underrecognized yet preventable contributor to pediatric foot pain, gait abnormalities, and deformity. Its effects arise from biomechanical, sensory, developmental, and structural mechanisms that intersect with socioeconomic disadvantage. A communication-centered approach integrated with community and policy-level interventions can significantly reduce musculoskeletal inequities. Recognizing footwear access as a determinant of pediatric orthopedic health creates opportunities for prevention across the life course.

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