HNSJ Humanities & Natural Sciences Journal
ISSN: (e) 2709-0833
www.hnjournal.net

Peer-Reviewed Journal
Indexed at: NSP - SJIF
Impact Factor 2022 = 4.91

RESEARCH TITLE

The Impact of a Safe Built Environment on Children's Active Commuting to School: A Comparative Analysis Between Kafr Qasim and Rosh HaAyin

Yaqeen Amer[1]

[1] Tel Aviv University, Tel Aviv, Israel.

Email: green.qassem1@gmail.com

HNSJ, 2026, 7(7); https://doi.org/10.53796/hnsj77/3

Received at 05/06/2026 **Accepted at 15/06/2026** **Published at 01/07/2026**

Abstract

This study examines the impact of a safe built environment on children's active transportation and independent mobility to school, focusing on structural disparities in pedestrian infrastructure between Arab and Jewish urban contexts. Utilizing Kafr Qasim and Rosh HaAyin as comparative case studies, the research adopts a descriptive-analytical approach, incorporating official engineering evaluations and field-survey documentation of road conditions, sidewalks, and traffic signaling in school vicinities. The findings reveal a stark systemic and infrastructural chasm between the two municipalities. In Kafr Qasim, school environments suffer from a critical deficit of continuous, standard-compliant sidewalks, alongside main school entrances positioned on hazardous road curvature lacking speed-calming measures, which severely impedes safe independent mobility. Conversely, the urban layout of Rosh HaAyin features pedestrian-centric design characterized by wide, unobstructed walkways, visible crosswalks, and integrated safety barriers. The study concludes that the absence of traffic safety infrastructure in Arab municipalities acts as a structural barrier that compels parental reliance on private motorized transport, thereby depriving children of the physical, psychological, and cognitive benefits of active commuting. Ultimately, the paper advocates for equitable planning interventions to establish institutionalized safe routes to schools.

Key Words: Active Commuting to School, Built Environment, Traffic Safety, Pedestrian Infrastructure, Kafr Qasim, Rosh HaAyin.

عنوان البحث

أثر البيئة العمرانية الآمنة على التنقّل النشط للأطفال إلى المدرسة: تحليل مقارن بين كفر قاسم وروش هعاين

المستخلص

تتناول هذه الدراسة أثر البيئة العمرانية الآمنة على النقل النشط للأطفال وحركتهم المستقلة إلى المدرسة، مع التركيز على الفوارق البنيوية في البنية التحتية للمشاة بين السياقين الحضريين العربي واليهودي. وباستخدام كفر قاسم وروش هعاين كحالتي دراسة مقارنتين، تعتمد الدراسة منهجًا وصفيًا تحليليًا، يشمل تقييمات هندسية رسمية وتوثيقًا ميدانيًا مسحيًا لأوضاع الطرق والأرصفة وإشارات المرور في محيط المدارس. وتكشف النتائج عن فجوة نظامية وبنيوية حادة بين البلديتين. ففي كفر قاسم، تعاني البيئات المدرسية من نقص حرج في الأرصفة المتصلة والمطابقة للمعايير، إلى جانب وقوع المداخل الرئيسة للمدارس على منحنيات طرق خطرة تفتقر إلى تدابير تهدئة السرعة، مما يعيق بشدة الحركة المستقلة الآمنة للأطفال. وعلى العكس من ذلك، يتميز التخطيط الحضري في روش هعاين بتصميم متمحور حول المشاة، يتجلى في ممرات مشاة واسعة وخالية من العوائق، وممرات عبور واضحة، وحواجز أمان مدمجة. وتخلص الدراسة إلى أن غياب البنية التحتية للسلامة المرورية في البلديات العربية يشكل عائقًا بنيويًا يدفع الأسر إلى الاعتماد على وسائل النقل الخاصة الآلية، بما يحرم الأطفال من الفوائد البدنية والنفسية والمعرفية للتنقل النشط إلى المدرسة. وفي النهاية، تدعو الدراسة إلى تدخلات تخطيطية عادلة تهدف إلى إنشاء مسارات آمنة مؤسسية إلى المدارس.

الكلمات المفتاحية: التنقّل النشط إلى المدرسة، البيئة العمرانية، السلامة المرورية، البنية التحتية للمشاة، كفر قاسم، روش هعاين.

Introduction

The late twentieth and early twenty-first centuries have witnessed profound shifts in human mobility patterns within urban spaces, heavily driven by rapid horizontal expansion, suburbanization, and an exponential rise in private vehicle ownership (Plaut & Moran, 2013). This structural transition has optimized automotive flexibility at the expense of non-motorized, active modes of transit (Central Bureau of Statistics [CBS], 2019). Concurrently, a substantial global decline in walking and cycling has emerged across all age cohorts, with the most alarming manifestation observed in children's daily journeys to and from educational institutions (SRFS, 2019; Plaut & Moran, 2013).

While historical trends reflected a high reliance on active commuting to school (ACS), contemporary school travel is overwhelmingly dominated by private motorized transport and institutional chaperoning (Hillman et al., 1990; McDonald & Aalborg, 2009). Empirical literature indicates that children's retreat from active mobility is not merely a matter of personal preference, but rather a direct consequence of a built environment that fails to accommodate pedestrian needs (Katzav, 2015; Yanai-Levison, 2015). Parents are highly sensitive to perceived traffic risks, fueled by high vehicular volumes, excessive speeds, and systemic deficiencies in pedestrian safety corridors (Dellinger et al., 2002; Tal et al., 2013). These dynamics acquire greater complexity when examined against the backdrop of planning disparities between socio-politically distinct municipal jurisdictions, such as Arab and Jewish urban centers (Zarfati et al., 2018). Consequently, this study addresses a central research question: To what extent does the physical environment provide safe active transit for children in the city of Kafr Qasim compared to the city of Rosh HaAyin?

Literature Review and Theoretical Framework

The Significance of Active Commuting and Physical Health Implications

Active commuting to school is conceptualized as the integration of physical exertion—principally walking and cycling—into the daily school routine as an alternative to passive, motorized transit (Tudor-Locke et al., 2001). The World Health Organization (WHO, 2010) identifies physical inactivity as one of the leading global risk factors for non-communicable diseases and premature mortality, estimating its contribution to millions of deaths annually (Lauby et al., 2016; Matusevich, 2009). Concurrently, childhood obesity rates have surged dramatically, reaching epidemic proportions and predisposing younger demographics to chronic conditions such as cardiovascular disease, type 2 diabetes, and early-onset hypertension (Grotto, 2013; Israel Medical Association [IMA], 2018). Comprehensive medical and epidemiological data consistently establish a robust inverse correlation between ACS and body mass index (BMI), demonstrating that regular active commuting substantially enhances cardiorespiratory fitness and metabolic health in developing children (Mendoza et al., 2012).

Psychological, Cognitive, and Social Benefits: The "Sustainable Happiness" Paradigm

The dividends of walking to school extend far beyond physiological metrics, deeply influencing a child's psychological well-being and cognitive architecture (Moran, 2006). Empirical evidence demonstrates that children who engage in active commuting exhibit significantly higher levels of concentration, alertness, and cognitive readiness during instructional hours than those transported passively (Rissel et al., 2014). Comparative behavioral studies indicate that ACS fosters positive emotional states, such as tranquility, structural relaxation, and environmental engagement, whereas passive transit often correlates with fatigue, anxiety, and diminished attention spans (Sersli, 2018; Ramanathan et al., 2014). This dynamic aligns with the framework of "Sustainable Happiness" (O'Brien, 2008, 2014),

which posits that safe, walkable environments cultivate intrinsic well-being by facilitating community interactions and positive environmental experiences, reinforcing active transit as a preferred lifestyle choice.

Global Initiatives and Engineered Safety Frameworks

To counteract the decline in pediatric walking rates, several nations have developed structural interventions (McDonald et al., 2013). Prominent among these is the "Safe Routes to School" (SRTS) initiative, which originated in Denmark and expanded internationally, utilizing targeted engineering modifications to urban infrastructure, including sidewalk widening, speed-calming implementations, and high-visibility crosswalks (McDonald et al., 2013; SRFS, 2019). In North America and the United Kingdom, the "Walking School Bus" (WSB) model has emerged as a successful community-led mechanism wherein children walk to school in organized groups along fixed routes and timetables under adult supervision (Green Communities Canada, 2014; Smith et al., 2015). Furthermore, nations like Japan have institutionalized school walking policies through national frameworks, resulting in exceptionally high rates of independent student pedestrian mobility (Nagisa et al., 2012). Conversely, in dense urban areas, active transit can be impeded by microclimatic challenges, such as Urban Heat Islands (UHI), which raise local temperatures and require specific engineering solutions like urban tree canopies and structural shading to sustain comfortable walking corridors (Piron, 2012).

Research Methodology

This study adopts a comparative descriptive-analytical methodology to evaluate the relationship between urban planning and pedestrian safety across two contrasting socioeconomic and administrative environments: Kafr Qasim (representing the Arab municipal sector) and Rosh HaAyin (representing the Jewish municipal sector), drawing upon established spatial parameters (Zarfati et al., 2018; Khalil, 2013). Data collection relied on two core analytical pillars:

1. **Documentary Analysis of Official Engineering Evaluations:** Specifically utilizing the comprehensive safety and infrastructure assessment report commissioned by the Kafr Qasim Municipality (2014) in coordination with the National Road Safety Authority.
2. **Empirical Field Surveying and Photographic Documentation:** Systematic spatial monitoring of road infrastructure, sidewalk continuities, pedestrian crossings, and regulatory signage surrounding educational facilities in both cities to identify physical impediments and geometric hazards based on national framework benchmarks (Katzav, 2015; Israel National Program, 2015).

Findings and Results

Case Study 1: The Built Environment Surrounding Schools in Kafr Qasim

The engineering analysis and empirical field mapping within the municipality of Kafr Qasim revealed deep structural deficiencies that present immediate safety hazards to students, effectively discouraging active commuting (Kafr Qasim Municipality, 2014). The localized data point to several systemic vulnerabilities:

- **Hazardous Entrance Geometry:** Multiple primary school gates are positioned directly along sharp, un-banked road curves. This layout restricts sightlines for oncoming motorists and exiting students, severely escalating the risk of pedestrian-vehicular conflicts (Kafr Qasim Municipality, 2014).

- **Sidewalk Discontinuity and Structural Deficits:** The surrounding pedestrian network suffers from severe fragmentation. Sidewalks are frequently non-existent, or when present, fall well below standard width requirements. Furthermore, these pathways are routinely obstructed by physical utilities or unauthorized parking, forcing children to walk directly on the vehicular right-of-way (Kafr Qasim Municipality, 2014).
- **Absence of Traffic Calming and Regulatory Signage:** There is a critical shortage of warning signs, school zone indicators, and visible pedestrian crosswalks. Moreover, the lack of guardrails or physical barriers to separate walkways from high-velocity lanes leaves students highly vulnerable during peak arrival and dismissal hours (Kafr Qasim Municipality, 2014).

Case Study 2: The Built Environment Surrounding Schools in Rosh HaAyin

In contrast, field observations and planning documentation within Rosh HaAyin demonstrated systemic adherence to modern pedestrian-oriented design and sustainable traffic engineering principles (Katzav, 2015; Zarfati et al., 2018):

- **High-Specification Walkways:** The urban corridors leading to educational institutions feature wide, continuous, and uniformly paved sidewalks that are strictly kept free of physical obstructions, allowing unobstructed multi-student pedestrian flow (Zarfati et al., 2018).
- **Integrated Traffic-Calming Systems:** School zones are heavily fortified with standardized speed humps, raised intersections, and highly visible, well-demarcated pedestrian crossings equipped with flashing warning signals and prominent signage (Israel National Program, 2015).
- **Climate Mitigation and Specialized Drop-Off Zones:** Pedestrian pathways integrate natural and artificial shading elements to reduce thermal stress (Piron, 2012). Additionally, the infrastructure includes designated "Kiss and Go" bays and dedicated bus lanes, ensuring that necessary motorized drop-offs occur completely segregated from active student pedestrian paths (Israel National Program, 2015).

Discussion

The empirical findings substantiate that the disparity in active commuting rates between Kafr Qasim and Rosh HaAyin is not primarily a function of divergent cultural preferences, but is fundamentally driven by the structural quality of the built environment (Tal et al., 2013). Parental anxiety regarding traffic safety in the Arab sector, which manifests as high rates of private vehicle escorting, represents a rational response to an engineered space that fails to guarantee basic pedestrian protection (Martin & Carlson, 2005; Kafr Qasim Municipality, 2014). These results validate theoretical models regarding parental risk perception; when public rights-of-way lack continuous sidewalks and protective barriers, the physical environment becomes inherently hostile to independent childhood mobility (Martin & Carlson, 2005; Mitra et al., 2015).

Additionally, the absence of shaded corridors in Kafr Qasim exacerbates microclimatic thermal discomfort within an increasingly dense urban fabric, further depressing the inclination to walk (Piron, 2012). This planning asymmetry highlights how historical and institutional disparities in municipal resource allocation translate into public health inequities (Zarfati et al., 2018). Children in poorly engineered urban environments are systemically denied the physiological benefits of active transit, exacerbating sedentary lifestyle trends, childhood adiposity, and associated metabolic risks (Grotto, 2013; Mendoza et al., 2013),

while missing crucial opportunities for cognitive development and localized community attachment (Ramanathan et al., 2014).

Conclusion and Implications

This study demonstrates that the urban infrastructure surrounding schools in Kafr Qasim acts as a structural barrier to active commuting, posing persistent traffic safety risks to children. Conversely, Rosh HaAyin exemplifies a pedestrian-supportive framework where engineering standards effectively safeguard student mobility. Resolving these spatial inequities requires moving beyond behavioral approaches that place the burden of traffic safety entirely on the child, shifting instead toward systemic urban planning interventions (Khalil, 2013; Zarfati et al., 2018).

Based on these conclusions, the following policy implementations are recommended:

1. **Geometric Remediation of School Zones:** Prioritize the physical reconfiguration of school access points in Kafr Qasim, moving entrances away from blind curves and establishing standardized, continuous sidewalk networks (Kafr Qasim Municipality, 2014).
2. **Systemic Traffic Calming:** Mandate the installation of physical speed-reduction mechanisms, high-visibility reflective crosswalks, and uniform regulatory school-zone signaling across all Arab municipal jurisdictions (Zarfati et al., 2018).
3. **Sustainable Mobility Programs:** Integrate urban shading strategies within municipal master plans to mitigate microclimatic heat stress (Piron, 2012), and establish institutional frameworks for programs such as "Safe Routes to School" and "Walking School Buses" once basic infrastructural integrity is secured (Israel National Program, 2015; McDonald et al., 2013).

References

Canadian Society for Exercise Physiology. (2011). *Canadian physical activity guidelines for children and youth*. CSEP.

Dellinger, A. M., Staunton, C. E., & Smith, J. (2002). Barriers to children walking and biking to school—United States, 1999. *Morbidity and Mortality Weekly Report*, *51*(32), 701–704.

Green Communities Canada. (2014). *School travel planning in Canada: A progress report*. Green Communities.

Grotto, I. (2013). *Obesity among children and adolescents in Israel: Situation report and policy*. Ministry of Health. [In Hebrew].

Hillman, M., Adams, J., & Whitelegg, J. (1990). *One false move: A study of children's independent mobility*. PSI Publishing.

Israel Medical Association & Israel Association for the Study and Treatment of Obesity. (2018). *Obesity as a chronic disease: Position paper and clinical recommendations*. [In Hebrew].

Israel National Program for the Promotion of an Active and Healthy Lifestyle. (2015). *Walking school bus: A guide for implementation in municipalities and schools*. Ministry of Health & Ministry of Education. [In Hebrew].

Kafr Qasim Municipality. (2014). *Summary report: Assessment of infrastructure and road safety in the vicinity of educational institutions in Kafr Qasim* (Commissioned by the National Road Safety Authority). [In Hebrew].

Katzav, Y. (2015). *The Israeli walkability index: Examining the friendliness of the built environment for pedestrians* (Master's thesis). Tel Aviv University. [In Hebrew].

Khalil, R. (2013). Smart growth and school siting: Supporting active transportation through urban planning policies. *Journal of Urbanism*, *6*(3), 211–229.

Central Bureau of Statistics. (2019). *Motor vehicles in Israel in 2018* (Statistical Report No. 1839). CBS. [In Hebrew].

Lauby, R., Martinez, S., & Gomez, J. (2016). Global physical inactivity and mortality trends: A decade review. *International Journal of Public Health*, *61*(4), 445–456.

Martin, S. L., & Carlson, S. A. (2005). Barriers to children walking to school as perceived by parents. *Journal of School Health*, *75*(1), 23–30.

Matusevich, N. (2009). Evaluation of physical inactivity costs in modern societies. *World Health Policy*, *14*(2), 112–125.

McDonald, N. C., & Aalborg, A. E. (2009). Why parents drive their children to school: Implications for Safe Routes to School programs. *Journal of the American Planning Association*, *75*(3), 331–342.

McDonald, N. C., Steiner, R. L., Palmer, C., & Bullock, P. J. (2013). Impact of the Safe Routes to School program on active transportation. *Journal of the American Planning Association*, *79*(2), 150–160.

Mendoza, J. A., Watson, K., & Nguyen, N. (2012). Active commuting to school and association with physical activity and adiposity among US youth. *Journal of Physical Activity and Health*, *9*(5), 621–631.

Mendoza, J. A., Watson, K., Baranowski, T., Nicklas, T. A., Uscanga, D. K., & Hanfling, M. J. (2013). The walking school bus and children's physical activity: A pilot cluster randomized controlled trial. *Pediatrics*, *131*(5), e1424–e1431.

Mitra, R., Buliung, R. N., & Faulkner, G. E. (2015). Spatial clustering and the temporal mobility of active school transportation. *Transportation Research Part A: Policy and Practice*, *71*, 105–116.

Mokdad, A. H., Marks, J. S., & Stroup, D. F. (2004). Actual causes of death in the United States, 2000. *JAMA*, *291*(10), 1238–1245.

Moran, M. (2006). *Active transportation and urban design: Health and environmental impacts* (Doctoral dissertation). Technion - Israel Institute of Technology. [In Hebrew].

Nagisa, S., Cherrett, T., & Smith, L. (2012). International comparisons of active travel to school: The case of Japan and Germany. *Journal of School Health*, *82*(5), 225–232.

O'Brien, C. (2008). Sustainable happiness: How happiness studies can contribute to environmental education. *Environmental Education Research*, *14*(3), 289–302.

O'Brien, C. (2014). Happiness and sustainability: Together at last! *Journal of Positive Psychology*, *9*(6), 512–519.

Piron, M. (2012). *Urban heat islands in Israel: Climatic effects and guidelines for shaded planning*. Ministry of Environmental Protection. [In Hebrew].

Plaut, P., & Moran, M. (2013). Changes in the distribution of mobility in urban spaces over recent decades. *Horizons in Geography*, *81*, 34–52. [In Hebrew].

Ramanathan, S., O'Brien, C., Faulkner, G., & Stone, M. (2014). Happiness in motion: Emotions, active transportation, and sustainable happiness in children. *Journal of School Health*, *84*(8), 516–523.

Rissel, C., New, C., & Wen, L. M. (2014). Evaluation of a bicycle training program for primary school children. *Transportation Research Part F: Traffic Psychology and Behaviour*, *25*, 80–89.

Sersli, S. (2018). Parental and children's perceptions of cycling to school: Assessing wellbeing and positive affect. *Travel Behaviour and Society*, *11*, 45–53.

Smith, L., Norgate, S. H., Cherrett, T., Davies, N., Winstanley, C., & Harding, M. (2015). Walking school buses as a form of active transportation for children: A review of the evidence. *Journal of School Health*, *85*(3), 197–210.

SRFS (Safe Routes for School). (2019). *The decline of walking and bicycling*. Safe Routes Info.

Tal, R., Moran, M., & Plaut, P. (2013). Children's walkability to school: The relationship between built environment characteristics, parental perceptions, and active transportation. *Transportation and Infrastructure*, *45*(2), 12–28. [In Hebrew].

Tudor-Locke, C., Ainsworth, B. E., & Popkin, B. M. (2001). Active commuting to school: An overlooked source of children's physical activity? *Sports Medicine*, *31*(5), 309–313.

Tüntsch, J. (2005). *The walking bus project: Implementation and impacts on childhood physical development in Germany*. Green Mobility Press.

Weisbrod, G., Vary, D., & Treyz, G. (2003). Measuring the economic costs of urban traffic congestion to business. *Transportation Research Record*, *1839*(1), 98–106.

World Health Organization. (2010). *Global recommendations on physical activity for health*. WHO Guidelines.

World Health Organization. (2014). *Health economic assessment tools for walking and for cycling*. WHO Regional Office for Europe.

Yanai-Levison, H. (2015). *A walkable city: Encouraging walkability in urban spaces as a lever for health and sustainability*. Transport Today and Tomorrow. [In Hebrew].

Zarfati, A., Ronen, O., & Blank, Y. (2018). *Safe walking infrastructure for children in the municipal space*. Center for Urbanism and Community, Tel Aviv University. [In Hebrew].