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Influence Of Socio-Environmental Factors On Physical Activity Patterns And Health-Related Physical Fitness Among Tribal Adolescents In Wayanad District, Kerala: A Review Of Existing Evidence

Harish K V
Assistant Professor, Department of Physical Education, St.Mary's College , S.Bathery
Wayanad, Kerala

Abstract

Physical activity during adolescence plays an important role in the development and maintenance of physical fitness, psychological well-being, and healthy lifestyle behaviors. However, physical activity is not determined solely by individual motivation or personal characteristics but is influenced by a complex interaction of socioeconomic, cultural, family, school, and physical-environmental factors. These influences may be particularly important among tribal adolescents, whose opportunities for physical activity may be shaped by geographical location, socioeconomic circumstances, cultural practices, educational opportunities, and access to sports and recreational facilities. Wayanad district of Kerala provides an important context for examining these relationships because it has a substantial Scheduled Tribe population distributed predominantly across rural areas and includes diverse tribal communities. This review examines existing evidence on the influence of socio-environmental factors on physical activity patterns and health-related physical fitness among adolescents, with particular emphasis on tribal adolescents in Wayanad. Literature concerning socioeconomic status, parental education, family support, peer influence, cultural practices, school environments, accessibility of recreational facilities, neighborhood characteristics, transportation, gender, and sedentary behavior is considered. The review indicates that physical activity is a multidimensional behavior influenced by factors operating at individual, interpersonal, organizational, and environmental levels. Evidence regarding the interaction between socioeconomic position and the built environment remains inconclusive, highlighting the importance of context-specific investigation. The review identifies a need for systematic research integrating socioeconomic, social, cultural, and environmental determinants with validated measures of physical activity and standardized assessments of health-related physical fitness.

Keywords:*Tribal adolescents,physical activity,socio-environmental factors ,socioeconomic determinants,physical fitness, health-related physical fitness,Wayanad ,Kerala, adolescent health*.

Introduction

Adolescence is a critical stage of human development characterized by rapid physical, physiological, psychological and social changes. Behaviors established during adolescence may influence health throughout life. Physical activity is one of the major lifestyle behaviors associated with healthy growth and development.

The World Health Organization recommends that children and adolescents aged 5–17 years undertake an average of at least 60 minutes of moderate-to-vigorous physical activity per day across the week. The majority of this activity should be aerobic, with vigorous-intensity aerobic activities and muscle- and bone-strengthening activities incorporated on at least three days per week.

Regular physical activity during adolescence contributes to cardio respiratory and muscular fitness, cardio metabolic health, bone health, cognitive outcomes and psychological well-being. WHO also emphasizes that safe and equitable opportunities should be available to children and adolescents to participate in enjoyable and age-appropriate physical activities.

Despite these established benefits, physical activity patterns differ substantially between individuals and populations. Participation may depend upon age, sex, motivation, socioeconomic status, family support, peer relationships, school environments and availability of sports facilities, transportation, neighborhood safety and cultural expectations.

Therefore, physical activity should be understood as a behavior embedded within a wider social and environmental context.

Concept of Socio-Environmental Influences

The term socio-environmental factors encompass the social and physical conditions in which individuals live, study and interact.

For adolescents, these factors may include:

- Family socioeconomic status
- Parental Education
- Parental occupation
- Household income
- Family support
- Peer relationships
- Cultural practices
- School environment
- Physical Education
- Availability of sports facilities
- Neighborhood characteristics
- Transportation
- Accessibility of recreational spaces
- Safety
- Geographical location
- Sedentary lifestyle and screen exposure

These factors frequently interact rather than acting independently.

For example, the presence of a sports ground may not result in participation if adolescents cannot reach the facility, lack parental support, face financial barriers or do not feel socially comfortable participation.

Tribal Adolescents and the Wayanad Context

Wayanad is an important geographical setting for studying tribal adolescent health in Kerala. Census 2011 provides specific district-level data on Scheduled Tribe populations in Wayanad.

The Census classification also demonstrates the diversity of Scheduled Tribe communities represented in Kerala, including communities such as Adiyan, Kattunayakan, Kurichiyan, Kuruman, Paniyan and others.

This diversity is important because the term **“**tribal population” should not be interpreted as a culturally or socioeconomically homogeneous group. Different communities may have different settlement patterns, occupations, cultural practices, Educational experiences and access to facilities.

Consequently, research on tribal adolescents in Wayanad should consider community and locality-specific characteristics whenever possible.

Physical Activity Patterns among Adolescents

Physical activity is a broad concept that includes movement undertaken during:

1. Leisure and recreation
2. Organized sport
3. Physical Education
4. Active transportation

5. Household activities
6. Occupational or livelihood-related activities
7. Traditional and community activities

WHO emphasizes that physical activity can occur through sport, leisure, transportation and everyday household activities.
This distinction is especially important in studies involving tribal adolescents. A young person may have substantial daily physical activity through walking, household responsibilities or traditional activities but limited participation in organized sport. Therefore, assessment of physical activity should ideally examine the type, frequency, duration and intensity of activities rather than simply classifying adolescents as active or inactive.

Socioeconomic Factors and Physical Activity

Socioeconomic status is an important potential determinant of adolescent health behavior.
Relevant indicators include:

- Parental Education
- Parental occupation
- Household income
- Housing conditions
- Household assets
- Educational opportunities
- Access to transportation
- Access to sports equipment
- Access to coaching

Socioeconomic circumstances may influence physical activity through several pathways.
For example, economically advantaged families may have greater access to organized sports, transportation, equipment and coaching. Conversely, economically disadvantaged adolescents may experience financial or logistical barriers.
However, socioeconomic status does not necessarily predict total physical activity in a simple manner.
An adolescent from a low-income household may engage in substantial walking or household activity, while an adolescent from a higher-income household may have greater access to organized sport but also spend considerable time in sedentary activities.
A systematic review examining socioeconomic position, built environment and physical activity among children and adolescents found that evidence regarding the interaction between socioeconomic position and the built environment was inconclusive. The authors emphasized the limitations of the existing evidence base and the need for higher-quality research.
This finding supports the need to investigate socioeconomic factors within specific cultural and geographical contexts.

Parental Education and Family Support

The family environment can influence adolescent physical activity through encouragement, role modeling, transportation, financial support and attitudes towards sport and exercise.
Parents may facilitate participation by:

- Encouraging outdoor activity
- Supporting sports participation
- Providing transportation
- Purchasing sports equipment
- Encouraging participation in competitions
- Allowing time for recreational activity
- Participating in physical activity themselves

Parental education may influence awareness of the health benefits of physical activity and knowledge about opportunities for sports participation.
However, parental Education should not be considered independently of broader socioeconomic circumstances.

Peer Influence and Social Support

Peer relationships become increasingly important during adolescence.
Friends can encourage participation by providing companionship, motivation and social reinforcement.
Peer influence may affect:

- Choice of sport
- Frequency of participation
- Enjoyment
- Motivation
- Continuation of participation
- Participation in organized activities

Conversely, lack of peer support may discourage participation.
Therefore, social support represents an important dimension of the socio-environmental context.

Cultural Influences
Culture may influence physical activity through traditional practices, community expectations, gender roles and attitudes towards sport.
Among tribal communities, traditional activities and daily routines may involve forms of physical activity that are not captured adequately by conventional sport-based measurements.
Research should therefore consider:

- Traditional games
- Walking
- Agricultural activities
- Household activities
- Forest-related activities
- Community activities
- Traditional occupations
- Organized sport
- Recreational activities

At the same time, social and technological changes may alter traditional patterns of physical activity.
Increasing access to smart phones, television, internet-based entertainment and digital games may contribute to increased sedentary behavior.
Therefore, tribal adolescent physical activity should be examined within the context of both traditional lifestyles and contemporary lifestyle transitions.
School Environment
The school represents one of the most important institutional environments for adolescent physical activity.
Important school-level factors include:

- Availability of playgrounds
- Physical education classes
- Sports equipment
- Qualified physical education teachers
- Sports coaching
- Inter-school competitions
- Extracurricular activities
- School sports policies
- Opportunities for active recreation

For adolescents who have limited access to community sports facilities, school may provide an important opportunity for structured physical activity.

The quality and accessibility of school physical activity opportunities may therefore contribute to differences in activity patterns.

Geographical Accessibility

Geographical accessibility may be particularly relevant in rural and geographically dispersed populations.

The distance between:

Home → School → Sports Facility → Community Facility

can influence opportunities for participation.

Long distances may reduce access to organized coaching and competitions. Transportation availability can also determine whether adolescents can participate in activities outside their immediate settlement. However, walking or cycling over long distances may simultaneously contribute to overall physical activity. Therefore, distance should be studied together with the mode of transportation rather than treated simply as a barrier.

Gender and Physical Activity

Gender is an important social determinant of adolescent physical activity. Boys and girls may experience different opportunities and constraints because of:

- Household responsibilities
- Safety concerns
- Cultural expectations
- Availability of facilities
- Parental attitudes
- Access to organized sport
- Availability of appropriate coaching

Research among tribal adolescents should therefore examine gender differences in both the amount and type of physical activity.

The analysis should avoid assuming that observed differences are purely biological; social and environmental circumstances may contribute substantially.

Physical Activity and Health-Related Physical Fitness

Physical activity and physical fitness are related but different concepts.

Physical activity refers to bodily movement resulting in energy expenditure.

Health-related physical fitness refers to physical characteristics and capacities associated with health.

Major components include:

Cardio respiratory endurance

Reflects the ability of the cardiovascular and respiratory systems to sustain prolonged physical activity.

Muscular strength

Represents the capacity of muscles to exert force.

Muscular endurance

Refers to the ability to sustain repeated or prolonged muscular activity.

Flexibility

Represents the range of movement available at a joint or group of joints.

Body composition

Refers to the relative proportions of fat mass and fat-free mass.

WHO identifies improved cardio respiratory and muscular fitness among the health benefits associated with physical activity in children and adolescents.

Therefore, investigating physical activity patterns together with health-related physical fitness may provide a more comprehensive understanding of adolescent health.

Conceptual Framework

The relationship proposed in this review can be represented as follows:

SOCIOECONOMIC FACTORS

Parental education

↓

Occupation

↓

Household economic circumstances

↓

Housing and resources

⬇

SOCIAL & CULTURAL FACTORS

Family support

↓

Peer support

↓

Cultural practices

↓

Gender norms

↓

Community participation

⬇

PHYSICAL & INSTITUTIONAL ENVIRONMENT

School facilities

↓

Sports grounds

↓

Recreational spaces

↓

Transportation

↓

Accessibility

↓

Neighbourhood safety

⬇

PHYSICAL ACTIVITY PATTERNS

Frequency

↓

Duration

↓

Intensity

↓
Type of activity
↓
Active transportation / sport / recreation / household activity
⬇
HEALTH-RELATED PHYSICAL FITNESS
Cardio respiratory endurance
↓
Muscular strength
↓
Muscular endurance
↓
Flexibility
↓
Body composition
This framework recognizes that the determinants operate at multiple levels and may interact with one another.
Measurement Considerations
A major methodological issue in future research is the accurate measurement of physical activity.
Possible approaches include:
Questionnaire-based assessment
Validated physical activity questionnaires can assess frequency, duration and intensity.
Objective assessment
Where resources permit, accelerometers or pedometers can provide objective information about movement.

Physical fitness assessment
Standardized field tests can be used to measure:

- Cardio respiratory endurance
- Muscular strength
- Muscular endurance
- Flexibility
- Body composition

Socioeconomic assessment
A standardized socioeconomic status scale appropriate for the Indian context can be considered.
Environmental assessment
Researchers may assess:

- Distance to facilities
- Availability of sports grounds
- Transportation
- Safety
- School facilities
- Neighborhood characteristics

A combination of subjective and objective measures would strengthen future research.
Research Gaps
The review identifies several important research gaps.
Limited Wayanad-specific evidence

There is a need for empirical evidence specifically examining socio-environmental determinants of physical activity among tribal adolescents in Wayanad.

Limited integration of determinants

Many studies focus on individual factors without simultaneously considering family, socioeconomic and environmental factors.

Limited tribal-specific measurement

Physical activity instruments developed for general populations may not capture all forms of physical activity relevant to tribal communities.

Limited research linking activity and fitness

There is a need to examine the relationship between physical activity patterns and multiple components of health-related physical fitness.

Gender-specific evidence

Further research is required to understand whether environmental and social determinants operate differently among tribal boys and girls.

Community-specific differences

Wayanad contains multiple Scheduled Tribe communities, and their social and environmental contexts may differ. Future research should avoid treating all tribal adolescents as a homogeneous population.

Implications for Health and Physical Education

The evidence reviewed suggests that interventions to promote physical activity among tribal adolescents should not focus exclusively on individual motivation.

Potential intervention areas include:

1. Strengthening school Physical education.
2. Improving access to safe sports and recreation facilities.
3. Providing opportunities for organized sports.
4. Encouraging active transportation where safe.
5. Increasing parental and community support.
6. Providing culturally appropriate physical activity programmes.
7. Addressing gender-related barriers.
8. Reducing excessive sedentary recreational behavior.
9. Providing trained coaches and physical education personnel.
10. Developing community-based physical activity programmes.

Such interventions should be designed with participation from adolescents, families, schools and local communities.

Conclusion

Physical activity patterns and health-related physical fitness among tribal adolescents are influenced by a combination of individual, socioeconomic, social, cultural, school and physical-environmental factors. Family socioeconomic circumstances, parental education, peer support, cultural practices, gender expectations, school opportunities, availability of sports facilities, geographical accessibility and transportation may influence the opportunities available to adolescents for physical activity.

The available evidence does not support a simple or universal relationship between socioeconomic position, built environment and physical activity. Instead, these relationships appear to vary according to population, setting and type of physical activity. Wayanad provides an important setting for further investigation because of its substantial Scheduled Tribe population and the diversity of tribal communities documented in the district.

There is a need for research that integrates socioeconomic, social, cultural and environmental variables with physical activity patterns and health-related physical fitness. Such research can provide evidence for culturally sensitive, school-based and community-based strategies to promote healthy physical activity among tribal adolescents.

The proposed research area can therefore contribute to a better understanding of how the social and physical environment influences adolescent health and physical fitness in a tribal population.

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