ISSN (P&E): 1996-7195, (O): 2957-899X DOI: https://doi.org/10.53350/pjmhs02025196.6

ORIGINAL ARTICLE

Parental Knowledge, Practices and Cultural Perceptions Regarding Infant Sunlight Exposure: A Cross- Sectional Study

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This article may be cited as:
Kabir MM, Shahid AR, Khan MW, Saeed HH, Malik N, Tariq U; Parental Knowledge, Practices and Cultural Perceptions Regarding Infant Sunlight Exposure: A Cross- Sectional Study. Pak J Med Health Sci, 2025; 19(06):27-32.

Received: 09-03-2025
Accepted: 25-06-2025
Published: 12-07-2025

ABSTRACT

Background: Sunlight exposure plays a critical role in the synthesis of vitamin D, essential for bone development and overall health in infants. Despite its importance, cultural beliefs, lack of awareness, and unsafe exposure practices may hinder appropriate utilization. This study investigates parental knowledge, practices, and cultural perceptions regarding infant sunlight exposure in a semi-urban Pakistani setting.

Objective: To evaluate parental knowledge, practices, and sociocultural factors influencing sunlight exposure in infants at POF Hospital Wah Cantt.

Methods: A cross-sectional study was conducted over four months involving 100 parents of infants aged 1 to 6 months. Data were collected through a structured questionnaire covering demographics, exposure practices, beliefs, and perceived benefits or harms of sun exposure. Descriptive statistics were computed using SPSS version 21.

Results: Among participants, 73% regularly exposed their infants to sunlight, with 69% doing so daily. Most preferred morning exposure (70%). Although 65% were aware of vitamin D benefits, only 35% used sunscreen. Cultural concerns like skin darkening (31%) and illness fear (21%) were common barriers.

Conclusion: While general awareness about sunlight benefits was observed, unsafe practices and cultural misconceptions remain prevalent. Targeted education addressing these gaps is necessary to improve infant health outcomes.

Keywords: Vitamin D, Sunlight Exposure, Infants, Parental Knowledge, Cultural Beliefs.

INTRODUCTION

Sunlight is a vital environmental factor that contributes significantly to human health, particularly through its role in the synthesis of vitamin D. Vitamin D is crucial for calcium homeostasis, bone mineralization, immune regulation, and prevention of skeletal disorders such as rickets in children and osteomalacia in adults[1]. In infants, adequate vitamin D levels are necessary for healthy growth and neurodevelopment. As breast milk contains limited vitamin D, sunlight exposure becomes an indispensable natural source, especially in low- and middle-income countries where supplementation may not be routine[2,3].

The American Academy of Pediatrics and global health bodies recommend limited but regular sun exposure for infants as a natural means of vitamin D synthesis. While sunlight is abundant in many countries, practices surrounding its exposure vary widely due to parental

knowledge, cultural beliefs, and environmental factors[3-5]. Unsafe practices, including excessive exposure without protection or complete avoidance due to misconceptions, can either increase the risk of skin damage or result in vitamin D deficiency. In South Asia, traditional norms such as avoiding sunlight for newborns to prevent illness, or limiting exposure due to aesthetic concerns like skin darkening, are still prevalent[4-7]. These beliefs can be strong even among educated populations, making awareness and behavior change complex. Wah Cantt, with its high literacy rates and urban characteristics, offers a unique setting to explore whether education alone translates into informed and safe practices. A broad body of literature documents parental practices related to infant sun exposure, highlighting substantial variation based on geography, culture, education, and health infrastructure. Studies from Ethiopia indicate that less than half of mothers practice proper sun exposure despite acknowledging its importance[6-9]. Urban residence and higher maternal education were linked with improved practices, while misconceptions about pneumonia and fear of supernatural harm like the "evil eye" hindered sun exposure.

Additional studies emphasize the influence of healthcare advice, social media, and community norms on parental knowledge and behavior. Even in high-literacy settings, misinformation or lack of direct counseling by pediatricians leads to inconsistent or unsafe exposure practices[10-12] The literature underscores that improving sun exposure practices requires not only knowledge dissemination but also addressing cultural and behavioral dimensions. Despite this global insight, few studies have investigated these factors in urban Pakistani populations like Wah Cantt. This study fills a critical research gap by evaluating how education, beliefs, and awareness interact to shape infant sunlight exposure behavior in a local context

This study investigates the knowledge, practices, and cultural perceptions among parents regarding infant sunlight exposure in Wah Cantt, aiming to inform public health efforts and policy interventions that encourage safe exposure practices without reinforcing harmful myths.

METHODOLOGY

This was a descriptive cross-sectional study conducted over a period of four months at the Pediatric Outpatient Department and Pediatric Wards of POF Hospital, Wah Cantt, Pakistan.

Study Population and Sampling

A total of 100 parents (either mother or father) of infants aged 1 to 6 months were enrolled in the study. Participants were selected using a convenience sampling technique.

Inclusion Criteria

Parents of healthy infants between 1 and 6 months of age who attended the pediatric department for routine visits or minor ailments.

Exclusion Criteria

Parents who were healthcare professionals (doctors) or whose infants were severely ill were excluded to avoid bias.

Data Collection Tool

A structured questionnaire was developed based on a literature review and expert consultation. It comprised two main parts:

1. Demographic information: Infant age and gender, parental education level, employment status, and number of children.

2. Sunlight exposure practices: Frequency, timing, duration, perceived benefits and harms, sunscreen use, and cultural beliefs (e.g., fear of skin darkening, evil eye).

The questionnaire was administered via face-to-face interviews conducted in the local language by trained data collectors to ensure clarity and consistency.

Data Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 21. Descriptive statistics including frequencies, percentages, means, and standard deviations were calculated. Results were presented in the form of tables and figures for clarity.

RESULTS

A total of 100 parents participated in the study. The mean age of the infants was 3.99 ± 1.4 months, with an equal distribution of male and female infants. On average, each family had 2.74 children. Among the parents, 36% were graduates, while 67% were unemployed, primarily housewives.

Regarding environmental exposure:

79% of respondents reported having adequate sunlight access at home.

73% of parents reported regularly exposing their infants to sunlight.

69% practiced daily exposure,21% twice a week,8% once a week,2% once in fifteen days and 44% initiated it within the first 15 days after birth, 34% between 16-30 days ,10% between 31-45 days and 125 after 45 days

70% preferred morning hours, consistent with

medical recommendations to avoid peak UV radiation.

35% of parents exposed infants for up to 2 hours daily, while others limited it to under an hour.

On knowledge and perceptions:

65% of parents identified vitamin D synthesis as the primary benefit of sunlight.

59% also cited its role in bone strengthening.

However, 65% did not use any sunscreen, and 31% expressed concerns about skin darkening due to sun exposure. Other barriers included fear of illness (such as pneumonia) and cultural superstitions like the evil eye.

The results were further supported by visual data representations (bar charts and pie charts), illustrating key findings:

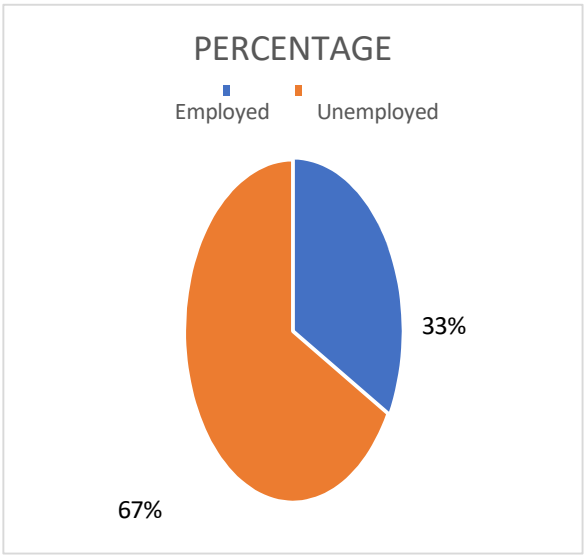

Figure1: Parents employment status

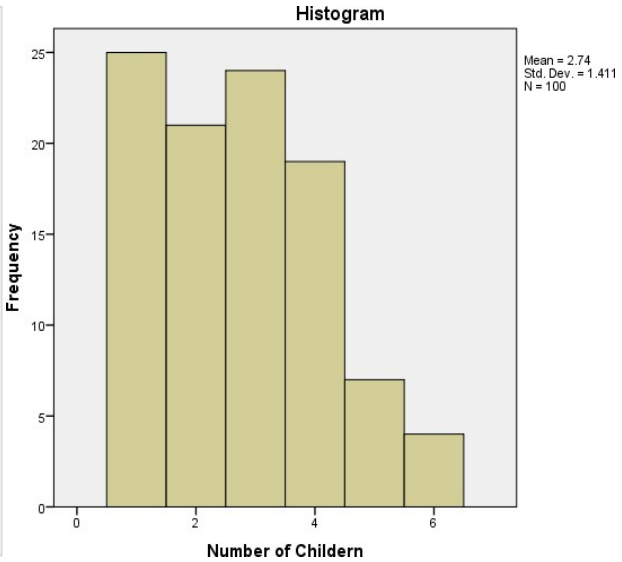

Figure 2: Age of child

Table 1: Reasons for Notexposing to Sunlight

Reason for not exposing	Yes (percentages)
Sun is bad for skin	10
Darken the skin color	31
No suitable place for sunlight exposure	6
Can cause cancer	0
Busy schedule	21
Air pollution	6
Fear of blindness	0
Fear of evil eye	0
Fear of catching illness	1

Table 2: Reasons for exposing to Sunlight

Reason for exposure	Yes (percentages)
Vitamin D production	65
Prevention of skin disease	3
Bone strengthening	59
Child's overall health	32
Help to sleep properly	8
Family custom	1

Table 3: Harmful effects of Sunlight

Harmfull effects	Yes (percentages)
Rickets	6
Skin damage	44
Hair damage	0
Cancer	4

In our study, we found out that the primary reason for not exposing their infants to sunlight was to prevent darkening of the skin color (31%).

In our study, we found out that the primary reason for exposing their infants to sunlight is the production of vitamin D (65%) and bone strengthening (59%).

In our study, we found out that the primary concern of parents regarding the harmful effects of sunlight was skin damage (44%).

DISCUSSION

This study found that while most parents in Wah Cantt recognize the importance of sunlight for infant health particularly its role in vitamin D synthesis and bone development behavioral gaps persist. These include irregular sunscreen use, variable exposure durations, and cultural fears that compromise the quality of sun exposure. The results align with similar studies from both low- and high-income countries, suggesting that awareness alone does not guarantee safe practices.

However, the fact that over a third of respondents exposed their infants for more than one hour often without sunscreen raises concern.

A noteworthy positive trend emerged in the high

proportion (70%) of parents who preferred morning sun exposure for their infants an encouraging finding aligned with WHO recommendations that advocate for early-day exposure to minimize harmful ultraviolet (UV) radiation. However, this initial compliance is undermined by inconsistent and, at times, risky practices. Specifically, over one-third of parents reported exposing their infants to sunlight for durations exceeding one hour, often without the application of sunscreen. Prolonged and unprotected sun exposure in infancy increases the cumulative risk of dermatological complications, including photoaging, sunburn, and potential long-term skin damage, given the increased sensitivity of infant skin[9-12].

The suboptimal use of sunscreen (reported by only 65% of participants) is a recurring theme in global health literature and reflects broader systemic issues. Similar patterns have been documented in countries such as Turkey, Nigeria, and various parts of South Asia, where sunscreen remains inaccessible, unaffordable, or culturally undervalued. In the present study, the low usage rate is compounded by culturally driven concerns: 31% of parents expressed fears of skin darkening as a consequence of sun exposure, revealing the influence of entrenched aesthetic ideals on health behaviors. These preferences for lighter skin tones rooted in historical, colonial, and media-influenced narratives continue to shape decision-making, often at the expense of evidence-based infant care. Comparable findings have been reported across the African continent, the Middle East, and South Asia, pointing to the transnational nature of beauty norms and their health implications[13-15].

The observed low sunscreen use (65%) reflects findings from Turkey, Nigeria, and parts of South Asia, where sunscreen is either unavailable, unaffordable, or not prioritized due to cultural norms More concerning is the persistence of misconceptions and harmful practices among highly educated parents a demographic typically assumed to be more health literate. This challenges the assumption that formal education alone is a reliable predictor of appropriate health behavior. It reinforces the need for targeted health education strategies that are not only factually accurate but also emotionally and culturally resonant. Effective interventions must account for the belief systems, fears, and values of the target population, especially when addressing behaviors so deeply influenced by tradition and identity[14,16].

In this context, healthcare professionals particularly pediatricians play a pivotal role. They are not merely dispensers of clinical knowledge but are positioned as influential change agents capable of correcting misinformation through brief, structured counseling during routine checkups. Evidence suggests that even short, well-structured interventions can positively influence parental attitudes and practices regarding infant sun exposure. These opportunities must be maximized through capacity building and integration into standard pediatric care[15-16]. Moreover, fears about skin darkening (reported by 31% of parents) reflect deeper aesthetic values that influence health decisions in this region. Similar beliefs have been reported in African, Middle Eastern, and South Asian studies. Simultaneously, digital platforms and social media represent powerful tools for public health messaging. With increasing internet penetration in Pakistan, especially among urban and peri-urban populations, digital outreach offers a scalable and cost-effective means to reinforce health messages. However, such content must be culturally attuned, visually engaging, and rooted in local language and idioms to resonate with the intended audience. A hybrid approach that combines clinical authority with digital engagement could bridge the existing knowledge-practice divide more effectively than either strategy in isolation[16-18].

Despite the high educational attainment among the study population, knowledge gaps and harmful myths were prevalent. This suggests that education must be coupled with targeted, culturally sensitive public health messaging. The role of healthcare providers, especially pediatricians, is critical. Multiple studies support the effectiveness of brief counseling sessions in shaping parental practices regarding sun exposure and the results of this study reflect a complex interplay between awareness, behavior, cultural context, and systemic barriers. While foundational knowledge regarding the benefits of sunlight for infant health is present among the population studied, its translation into safe, consistent, and culturally appropriate practices remains limited. Overcoming this disconnect requires a multifaceted intervention strategy one that includes professional counseling, culturally competent education, and innovative digital outreach. By addressing both informational and cultural dimensions of behavior, public health stakeholders can foster environments in which awareness is not just present, but actively guiding safe and sustainable caregiving practices[17-20]. Digital platforms and media campaigns can also be leveraged to reinforce safe sun exposure messages. Given the increasing internet penetration in Pakistan, social media outreach complemented by healthcare guidance can bridge knowledge-practice gaps.

CONCLUSION

The study finds a gap between parental knowledge and behavior on infant sun exposure in a literate Pakistani population. Despite awareness of vitamin D benefits, safe

practices are lacking due to cultural fears and misconceptions. Addressing this requires targeted education, routine pediatric counseling, and community-driven campaigns to promote safe, culturally sensitive sun exposure.

Limitations

This study has several limitations that warrant consideration. Firstly, the sample size was relatively small (n = 100), which may limit the ability to generalize findings to the broader population. Additionally, the use of a convenience sampling technique introduces the potential for selection bias, as participants who attend hospital services may not be representative of the wider community. These factors may reduce the external validity of the study. Future research should consider employing larger, more diverse samples drawn from multiple settings to improve generalizability. Moreover, utilizing probability-based sampling methods would enhance the representativeness of the sample and reduce the risk of selection bias, thereby strengthening the robustness of future findings.

Recommendations:

Educational programs should be integrated into routine pediatric care to address common misconceptions and emphasize the importance of appropriate sun exposure for vitamin D synthesis. Healthcare providers, particularly pediatricians, should proactively counsel parents during well-baby visits. Additionally, culturally tailored health communication strategies delivered through community workshops and digital media can help bridge the gap between knowledge and practice. Strengthening these efforts will contribute to reducing vitamin D deficiency and improving infant health outcomes in similar urban and semi-urban populations.

DECLARATION

Acknowledgement

The authors would like to express their sincere gratitude to the administration of POF Hospital Wah Cantt for their support throughout the study. We also extend our heartfelt thanks to the parents who participated in this research for their time, cooperation, and valuable insights.

Funding

No external funding was received

Conflict of Interest

The authors declare no conflict of interest related to this study.

Ethical Approval

This study was reviewed and approved by the Institutional Review Board (IRB) of POF Hospital Wah Cantt. Informed consent was obtained verbally from all participants prior to data collection, and confidentiality was maintained throughout the research process.

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