Intentional sun exposure in infancy in Sakarya, Turkey

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ABSTRACT

Objective: To determine the extent of intentional sun exposure in infancy, and the prevalence of maternal belief that potentially increases the children's harm risk from ultraviolet radiation. The major determinants of mothers' beliefs and behaviors regarding sunning were also assessed.

Methods: Three hundred and ninety six Caucasian women mothering 0-12 month old infants, attending to Sakarya State Hospital "Healthy Infant" outpatient clinic in November 2003, filled in the questionnaire after giving their informed consent. Each mother was asked 11 structured questions regarding maternal education, beliefs regarding benefits or harms of sun exposure, use of sunlight for therapeutic purposes, use of sun protection, and source of knowledge.

Results: The mean age of the mothers' was 27.37 ± 5.36 years and the children's was 5.71 ± 3.53 months. Two hundred and thirty-five mothers (64.1%) believed that sunlight is "harmful", but 296 (79.7%) named one benefit of intentional baby sunning. "Sun causes cutaneous diseases" was the most frequently (n=83/126) mentioned harm and "sun strengthens bones and teeth" was the number one (n=250/296) benefit according to the mothers. The leading source of knowledge for the "beneficial effects" of the sun was health care professionals (physician, midwife, nurse) 45.7% (130/284). There was no significant correlation between mothers' sunning behavior and age, education level, being advised so by a health care professional or believing that the sun was "harmful".

Conclusion: As these results display being the leading source of knowledge and initiative of healthy/risky behaviors, primary health care physicians/workers have to be informed regarding the vitamin D supplementation and risks of sun exposure.

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The use of sunlight for therapeutic purposes (heliotherapy) dates back to ancient Rome and Greece.[1] Sunlight, along with "fresh air," had previously been viewed as a type of tonic, able to renew health and vigor. During the 19th century, many individuals, particularly women of the upper social classes were vigilant in avoiding excessive sunlight. The association between sunlight exposure and skin cancer was not yet known, and sun avoidance and protection were motivated by the desire to avoid sunburn, suntan, and damage to the complexion.[2] Several social changes, including many activities resulting in significant sun exposure, took place during the 19th century. This led to a growing popularity of sunbathing that achieved a mass acceptance in the 1920's.[3] Children urged to "keep at the sunny side of the road and never to walk on the shady side". Outdoor sunbathes were recommended for infants.[4] Conditions with bony deformities have been described in ancient medical writings from first and second centuries. Although these descriptions could be interpreted as evidence for existence of rickets, it was not until mid-

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17th century that clear description of rickets emerged. In the mid-17th century England, rickets was endemic in the Southwest counties of Dorset and Somerset.[5] By the late 19th and 20th century, faulty environment (poor hygiene, lack of fresh air, and sunshine) or lack of exercise was implicated in its etiology. Animal experiments, appreciation of folklore advocating the benefits of cod-liver oil,[6,7] and the geographical associations of rickets to lack of sunshine were all relevant factors in the advancement of knowledge in the conquest of this malady.[5] The origin of rickets remained uncertain until the beginning of 20th century. It was then that ultraviolet (UV) light, and dietary factors were associated with the origin of this disease.[3] In 1920s a public health program instituted in New Haven, Connecticut, instructed mothers on administering sunbathes to newborns to prevent rickets. Nurses visited homes to demonstrate the sunbathes, which were recommended to begin with exposure to the hands and face 10-15 minutes daily, and to increase 2-3 minutes daily until the newborn's entire body was exposed for one hour twice daily.[4] The Centers for Disease Control and Prevention, with the support of many organizations including the American Academy of Pediatrics (AAP) and the American Cancer Society, has recently launched a major public health campaign to decrease the incidence of skin cancer by urging people to limit exposure to UV light.[8,9]

This study was conducted to determine the extent of intentional sun exposure in 0-12 months old children in Sakarya city centre, and the prevalence of maternal belief that potentially increases the children's risk for harm from UV radiation. The major determinants/ sources of mothers' beliefs and behaviors regarding sunning were also assessed.

Methods. Three hundred and ninety six Caucasian women mothering 0-12 months old infants, attending to "Healthy Infant" outpatient clinic in November 2003, filled in the questionnaire after giving their informed consent. Each mother was asked 11 structured questions regarding maternal education, beliefs regarding benefits or harms of sun exposure, use of sunlight for therapeutic purposes, use of sun protection, and source of knowledge. The interview consisted of both open ended and set response-questions (yes/no/unsure). The interview questions were internally validated by test-retest procedure.

Statistical analysis. Educational level was dichotomized as low (5 years first level primary school education and below) and high (8 years second level primary school and higher). Results are mainly presented as mean ± standard deviation, and as proportions. The Spearman rank correlation coefficient was computed for nonparametric variables.

Results. Three hundred and ninety-six questionnaires were distributed. Twenty-nine (7.3%) questionnaires dropped out due to missing data (age, education level, job). The mean age of the mothers' was 27.37 ± 5.36 years, and the children were 5.71 ± 3.53 months. Proportion of literate women was higher than Turkish women in general (93.5% versus 72.62%)[10] (**Table 1**). The great majority of the study population (n=323, 88%) mentioned their job as "housewife". Although 235 mothers (64.1%) believed that sunlight is "harmful", 296 (79.7%) named one benefit of intentional baby sunning. "Sun causes cutaneous diseases" was the most frequently (n=83/126) mentioned harm and "sun strengthens bones and teeth" was the number one (n=250/296) benefit according to the mothers (**Table 2**). There were various sources of knowledge for the "beneficial effects" of the sun: health care professionals (physician, midwife, nurse) 45.7% (130/284), elderly relatives 30.3% (86/284), media (television, radio, news papers, and magazines) 18% (51/284), and books 6% (17/284). Of all the mothers 321 (87.5%) were sunning their children outside and 216 (58.9%) were doing this between before 11 a.m. and after 3 p.m. It was advised to sun their children to 243 (66.2%) mothers, where the "neighbors" were the most frequent (34.3%, 86/251) advisor. Daily sunning period was changing between 5 to 180 minutes most frequently 30 minutes (31.3%, 96/307). The question regarding the decision maker for these periods was answered by 127 mothers: Physician (n=31), child's mother (n=29), elder relative (n=22), midwife/nurse (n=22), knowledge from the television (n=13), a friend (n=10). When asked regarding the usage of sun protective product for the child 60/316 mothers claimed to use at every condition and 23/316 claimed that they were using such products only at the beach. Among 121 (33%) answers to the question regarding the sun protective factor (SPF) of the product 86 (71%) were using a product with 15 SPF or above and of them 65 (75.6%) were applying this 15-30 minutes before going out. More than half of the mothers (n=208, 56.7%) were also sunning their children behind window. There was no significant correlation between mothers' sunning behavior and age, education level, being advised so by a health care professional, believing that the sun was "harmful".

Discussion. Despite of the high proportion (64.1%) of the mothers who believe that sun is

Table 1- Educational level of the study population.

Level	n (%)
Low	
Illiterate	24 (6.5)
Literate without diploma	24 (6.5)
Primary school	189 (51.5)
High	
Junior high school	39 (10.6)
High school	68 (18.5)
Higher education	23 (6.3)
Total	367 (100)

Table 2 - Causes and benefits of the sun.

Effects	n (%)
Why harmful?	
Causes cutaneous diseases	83 (22.6)
Causes diseases	18 (4.9)
Causes headache/sun stroke	16 (4.4)
There are holes in the ozone layer	9 (2.5)
No answer/no specific reason	224 (61)
Why beneficial?	
Sun strengthens bones and teeth	250 (68.1)
Beneficial for development	29 (7.9)
It enhances appetite	10 (2.7)
It regulates sleep and the child gets fresh air	7 (1.9)
No answer/no specific reason	71 (19.3)

harmful, great majority (87.5%) was sunning their children. Beyond this, the initiative for this behavior was a health care professional in 45.7% of the cases. The most frequent reason for sunning the child was related to teeth and bones which are medically related to vitamin D. Vitamin D is critically important for the development, growth, and maintenance of a healthy skeleton from birth until death. It accomplishes this by increasing the efficiency of the intestine to absorb dietary calcium. When there is inadequate calcium in the diet to satisfy the body's calcium requirement, vitamin D communicates to the osteoblasts that signal osteoclast precursors to mature and dissolve the calcium stored in the bone.[7] In their historical reviews Dunn[11] and Holick[12] reported that Glisson, Deboot and Whistler called attention to the bone disease identified by deformities of the skeleton, including enlargement of the joints of the long bones and rib cage, curvature of the spine and thighs enlargement of the head, and shortened stature, as well as generalized muscle weakness in children who loved in the industrialized cities of Great Britain and northern Europe and at those times for treatment of rickets and osteomalacia, Professor Armand Trousseau (1801-1867) recommended cod-liver oil and for those in whom first dentition is not complete, the of good nurse. Roelandts[13] reported that Palm from Edinburgh suggested that the sun could play a therapeutic role in rachitis, but he was ignored in his own city and everywhere else, in 1890. Currently, the Centers for Disease Control and Prevention, with the support of many organizations including the AAP and the American Cancer Society, have recently launched a major public health campaign to decrease the incidence of skin cancer by urging people to limit exposure to UV light. Indirect epidemiologic evidence now suggests the age at which direct sunlight exposure is initiated is even more important than the total sunlight exposure over a lifetime in determining the risk of skin cancer.[14-16] Thus, guidelines for decreasing exposure include directives from the AAP that infants younger than 6 months should be kept out of direct sunlight, children's activities that minimize sunlight exposure should be selected, and protective clothing as well as sunscreens should be used.[9] The recommended adequate intake of vitamin D cannot be met with human milk as the sole source of vitamin D for the breast-feeding infant. Although there is evidence that limited sunlight exposure prevents rickets in many breast-fed infants.[17-21] In the light of growing concerns regarding sunlight and skin cancer and the various factors that negatively affect sunlight exposure, it seems prudent to recommend that all breast-fed infants are given supplemental vitamin D. Supplementation should begin within the first 2 months of life. As noted above, it is very difficult to determine what is "adequate" sunlight exposure for an individual breast-fed infant.[9] In this study, the most frequent source of knowledge for the "beneficial effects" of the sun was health care professionals. To obtain this benefits, mothers were sunning their children mostly for 30 minutes/day, which is frequently recommended by a health care professional. Only 23.4% of the mothers declared to use a sun protective product with SPF $\geq$15. There is a strong scientific evidence that demonstrates that 25 hydroxy vitamin D of at least 20 ng/ml is required to maintain calcium homeostasis without developing secondary hyperparatroidism.[22] Exposure of the body, in a bathing suit, to one minimal erythemal dose (MED; namely, slight redness of the skin) is equivalent to taking between 10,000 and 25,000 IU of vitamin D orally. Therefore, exposure of hands, face, arms, and legs to sunlight to an amount of time equal to approximately 25% of what it would take to develop a mid sunburn; namely, one MED, 2-3 times a week

is more than adequate to satisfy the bodies vitamin D requirement and enough to store some vitamin D3 in the body fat. After this exposure, a sunscreen with an SPF 15 or greater can be applied if the person wishes to remain outdoors. This will afford the individual to take advantage of the beneficial effect of sunlight while preventing the damaging consequences resulting from excessive exposure to sunlight.[7,23] Diffey[24] reported that sunscreen users should be to apply sunscreen liberally to exposed sites 15-30 minutes before going out into the sun, followed by reapplication of sunscreen to exposed sites 15-30 minutes after sun exposure begins. Further, reapplication is necessary after vigorous activity that could remove sunscreen, such as swimming, toweling, or excessive sweating and rubbing.[24]

As a conclusion, the results of this study reveal that the leading sources of knowledge, conditioning healthy or risky behaviors of mothers regarding sun protection for their infants, are primary health care physicians/nurses/midwives. Thus, these health professionals have to be informed regarding vitamin D supplementation and sun protection, in-depth.

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