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Cognition-Behavior Disconnect in Melanocytic Nevi Management among College Students: A Cross-Sectional Survey and Health Education Implications

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Abstract

Objective: To systematically analyze the phenomenon and specific manifestations of the cognition-behavior gap regarding melanocytic nevi among college students, and to provide empirical evidence for curriculum-based reform of dermatological health education on campus.

Methods: A cross-sectional survey was conducted among 155 college students at a university in Shenzhen between January and April 2026 using self-administered electronic questionnaires. Key variables including early recognition ability (ABCDE criteria mastery), sun-protection implementation rate, skin self-examination regularity, and healthcare-seeking behaviors were analyzed. Knowledge acquisition channels and health education content needs were also investigated.

Results: Although 91.61% of students were aware of the malignant transformation risk of melanocytic nevi, only 5.81% could fully recite the ABCDE criteria. While 65.16% acknowledged the preventive significance of sun protection, merely 1.29% used sunscreen regularly throughout the year. Although 85.81% stated they would seek formal medical care upon nevus changes, 81.29% had never actually consulted a doctor for nevus-related concerns. Classroom teaching (76.13%) and online media (68.39%) were the primary knowledge sources, and skill-oriented content—proper sun-protection methods (86.45%) and skin self-examination techniques (80.65%)—ranked highest among educational needs.

Conclusion: College students exhibit a dual disconnect in melanocytic nevus management: "high risk awareness with low recognition ability" and "high attitudinal willingness with low behavioral implementation." University health education should transition from a "fear-based warning" paradigm to a "skill-based empowerment" approach, promoting the curricular integration of the ABCDE criteria, standardized self-examination protocols, and year-round sun-protection strategies.

Keywords Melanocytic nevus; Cognitive disconnect; Health behavior; Sun protection; Self-examination; University students

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1 Introduction

The global incidence of cutaneous melanoma continues to rise steadily. Although China remains a low-incidence region, annual growth rates of 3%–5% have been observed in recent years, with the upward trend among younger populations warranting particular concern [1,2]. The prognosis of melanoma is inversely correlated with tumor thickness at diagnosis: melanoma in situ achieves nearly 100% cure rates following complete excision, whereas lesions exceeding 4.0 mm in thickness are associated with 5-year survival rates below 50% [3]. This stark contrast—"early-stage curability versus late-stage near-certain mortality"—positions public education as an indispensable frontline component of melanoma control systems. Under ideal circumstances, individuals equipped with basic recognition skills can detect suspicious lesions through regular skin self-examination and seek timely medical consultation, thereby accessing intervention at a curable stage.

However, reality diverges considerably from this ideal. College students, as a population possessing both relatively high cognitive capacity and substantial autonomy in health self-management, should theoretically constitute an advantaged group for early melanoma detection. Nevertheless, existing evidence suggests that this population's knowledge regarding melanocytic nevi falls far short of early warning requirements, with particularly pervasive deficiencies in mastery of the ABCDE early recognition criteria [4,5]. More notably, cognitive deficits do not equate to attitudinal passivity—many students recognize the importance of sun protection and monitoring, yet rarely translate these cognitions and attitudes into sustained, standardized behavioral practices [6]. This fractured state of "knowing without believing, believing without acting" represents not only a unique challenge in dermatological health but also a common conundrum in health behavior promotion research more broadly.

Within the current university health education framework, content pertaining to melanocytic nevi and skin oncology remains largely absent. The few initiatives that address this topic predominantly employ "fear-based" narrative strategies—eliciting anxiety through graphic depictions of advanced melanoma cases—while seldom providing systematic early recognition tools or standardized behavioral guidance. Although such approaches may elevate risk awareness, they fail to equip students with practical operational skills. Worse, they may induce feelings of helplessness arising from "knowing danger without knowing how to respond," ultimately neither facilitating behavior change nor needlessly amplifying health anxiety [7,8]. Therefore, a clear delineation of the specific manifestations, magnitude, and stratification of the cognition-behavior disconnect among college students, alongside an understanding of their current knowledge acquisition status and genuine educational needs, constitutes an essential prerequisite for designing effective health education interventions.

Based on the foregoing analysis, this study addresses three closely interrelated questions: (1) At which specific junctures and to what extent do cognition-behavior disconnects manifest in college students' management of melanocytic nevi? (2) What are the existing channels of knowledge acquisition, and what characteristics define students' content needs for health education? (3) What specific implications do these findings hold for curriculum design and pedagogical strategies in university health education?

2 Materials and Methods

2.1 Study Participants

A convenience sampling method was used to recruit students from a university in Shenzhen between January and April 2026. Inclusion criteria: ability to complete the questionnaire independently and provision of informed consent. Exclusion criteria: severe mental or cognitive disorders that prevented comprehension of the questionnaire content. A total of 155 electronic questionnaires were distributed, and 155 valid responses were returned, yielding a valid response rate of 100%.

2.2 Survey Method

A cross-sectional study design was adopted, and a self-administered anonymous electronic questionnaire was constructed using the Wenjuanxing platform. The core variables directly relevant to the research questions included: (1) Mastery of the ABCDE criteria: participants rated their familiarity with the five early recognition features on a five-level scale ranging from "completely unfamiliar" to "able to fully recite all five items"; (2) Sun-protection behaviors: frequency of general sun-protective measures during outdoor activities and specific sunscreen application frequency were separately assessed; (3) Self-examination behaviors: frequency and regularity of skin self-examination were recorded; (4) Healthcare-seeking behaviors: "previous actual consultation history" was distinguished from "hypothetical consultation intention upon change" to reveal the intention-behavior gap; (5) Knowledge acquisition channels (multiple-choice); (6) Health education content needs (multiple-choice). Demographic characteristics and basic nevus status were also collected as background variables.

2.3 Statistical Analysis

Data were analyzed using SPSS 26.0 software. Categorical variables were described as frequencies and percentages. The chi-square goodness-of-fit test was used to examine the distributional balance of responses across variable categories. A P-value <0.05 was considered statistically significant.

3 Results

3.1 Baseline Characteristics and Nevus Distribution

The demographic characteristics and baseline nevus distribution of the 155 participants have been detailed in our prior publication focusing on the overall KAP status [9]. As shown in Table 1, among the respondents, 67 (43.23%) were male and 88 (56.77%) female. A total of 147 participants (94.84%) reported having melanocytic nevi, with facial (58.06%) and extremity (46.45%) distribution being most common; 18 participants (11.61%) reported nevi at special sites (palms/soles/subungual areas). Full demographic details are presented in Table 1 [9].

Table 1: Demographic characteristics and nevus distribution of participants (n=155) [Adapted from Ref. 9 with updated analytical grouping]

Variable	Category	n (%)	Variable	Category	n (%)
Gender	Male	67 (43.23)	Number of nevi	0	8 (5.16)
	Female	88 (56.77)		1–5	87 (56.13)
Grade	Freshman–Junior	19 (12.26)		6–20	48 (30.97)
	Senior	110 (70.97)		>20/Unclear	12 (7.74)
	Postgraduate+	26 (16.77)	Special sites	Yes (palms/soles/subungual)	18 (11.61)
Skin type	II–III	62 (40.00)		No	137 (88.39)
	IV–V	93 (60.00)	Congenital nevi	Yes (<1.5 cm)	70 (45.16)
				No	74 (47.74)
				>1.5 cm	11 (7.10)

3.2 Quantification of Core Cognition-Behavior Disconnect Indicators

The survey revealed four significant layers of disconnect in college students' melanocytic nevus management.

Layer 1: The Gap between Risk Awareness and Recognition Ability. A total of 91.61% of respondents had at least heard of the malignant transformation potential of melanocytic nevi, with 56.77% self-rating as "relatively knowledgeable" or "very knowledgeable" about the risk. However, when asked about the

ABCDE criteria for early melanoma recognition, 56.13% reported "complete unfamiliarity," only 12.26% could name three or more items, and merely 5.81% (n=9) could fully recite all five criteria.

Layer 2: The Gap between Sun-Protection Cognition and Execution. Although 65.16% acknowledged that sun protection was "meaningful" or "very meaningful" for preventing malignant transformation of nevi, only 34.84% reported frequently or always adopting sun-protective measures during outdoor activities, and merely 1.29% (n=2) used sunscreen regularly throughout the year. More notably, 58.06% used sunscreen only occasionally during summer, while 25.16% never used it, revealing a pronounced "seasonal and sporadic" pattern.

Layer 3: The Gap between Healthcare-Seeking Attitude and Actual Behavior. When presented with the hypothetical scenario of "what would you do if a nevus changes," 85.81% selected "visit a formal dermatology department," with none choosing a beauty salon. However, only 18.71% had ever actually consulted a doctor for a nevus-related concern, meaning 81.29% had never sought any medical advice regarding melanocytic nevi. The highly rational disposition in hypothetical scenarios stands in sharp contrast to the low actual consultation rate.

Layer 4: The Gap between Self-Examination Endorsement and Regularity. Although 74.84% believed that asymptomatic nevi "should be regularly self-monitored," actual behavioral data showed that only 14.19% performed self-examination once or twice per year, while those conducting regular monthly or quarterly examinations totaled merely 4.52% (n=7); 49.68% performed checks only sporadically "when they thought of it," and 31.61% never performed self-examination (Table 2).

Table 2: Comparison of cognition-behavior disconnect indicators in melanocytic nevus management among college students [n (%)]

Disconnect Layer	Cognition/Attitude Dimension ("Know" and "Believe")	%	Behavioral Execution Dimension ("Act")	%	Disconnect Magnitude
Recognition ability	Aware of malignant risk (relatively/very knowledgeable)	56.77	Can fully recite all 5 ABCDE items	5.81	~51 percentage points
			Can name ≥3 ABCDE items	12.26	~44.5 percentage points
Sun-protection execution	Agree sun protection has preventive value	65.16	Regular year-round sunscreen use	1.29	~64 percentage points
			Frequently/always adopt sun-protective measures	34.84	~30 percentage points
Healthcare-seeking	Would choose formal hospital upon changes	85.81	Previously consulted doctor for nevus	18.71	~67 percentage points
Self-examination regularity	Believe regular self-observation is necessary	74.84	Monthly/quarterly regular self-examination	4.52	~70 percentage points

3.3 Knowledge Acquisition Channels and Health Education Content Needs

The primary channels through which students acquired knowledge about melanocytic nevi were classroom teaching (76.13%, n=118), online media (68.39%, n=106), and healthcare institutions (65.81%, n=102). Nine participants (5.81%) reported never having acquired relevant knowledge through any channel. Regarding educational needs, 69.68% (n=108) explicitly desired or strongly desired that their university conduct health education on melanocytic nevi. Ranked by demand intensity, the most desired content areas were: proper sun-protection methods (86.45%, n=134), skin self-examination techniques (80.65%, n=125), early melanoma recognition features (77.42%, n=120), standardized nevus observation methods (76.13%, n=118), and legitimate pathways for scientific nevus removal (69.68%, n=108). The ranking of content needs clearly demonstrates a "skill-oriented over knowledge-oriented" preference—the most popular items were all directly actionable practical skills rather than static factual knowledge (Table 3).

Table 3: Knowledge acquisition channels and health education content needs (n=155)

Knowledge Acquisition Channels (multiple choice)	n (%)	Desired Health Education Content (multiple choice)	n (%)
Classroom teaching	118 (76.13)	Proper sun-protection methods	134 (86.45)
Online media	106 (68.39)	Skin self-examination techniques	125 (80.65)
Healthcare institutions	102 (65.81)	Early melanoma recognition features	120 (77.42)
Social media	89 (57.42)	Standardized nevus observation methods	118 (76.13)
Family/friends	55 (35.48)	Scientific pathways for nevus removal	108 (69.68)
Never acquired	9 (5.81)	Desire/strongly desire school-based education	108 (69.68)

4 Discussion

This empirical survey of 155 college students reveals four layers of cognition-behavior disconnect in melanocytic nevus management, each significant not only statistically but also in terms of practical public health implications.

The recognition ability disconnect (~51 percentage points) constitutes the most fundamental cognitive deficit. The ABCDE criteria, as an internationally standardized self-screening tool for melanoma, are concise and operable, making them theoretically suitable for dissemination to the general public [3]. Our finding that only 5.81% could fully recite all five criteria parallels observations by Mahmood et al. [10] in a Pakistani population, collectively suggesting that public familiarity with the ABCDE criteria remains broadly insufficient. This substantial gap indicates that Chinese college students may lag considerably behind their counterparts in developed countries regarding early melanoma recognition education. Notably, students are not lacking in learning motivation—77.42% actively requested instruction on early recognition features. The problem lies on the supply side, not the demand side. This knowledge can be fully transmitted through 1–2 hours of standardized teaching, requiring modest educational investment while yielding substantial potential health benefits, positioning it as a "high cost-effectiveness" health education initiative.

The sun-protection execution disconnect (~64 percentage points) and the self-examination regularity disconnect (~70 percentage points). Within a behavioral economics framework, this gap can be understood as a manifestation of "temporal discounting"—individuals systematically assign excessive decision-making weight to immediate costs (the inconvenience of sunscreen application, the time consumed by self-examination) while undervaluing long-term health benefits (reduced melanoma risk decades later). Compounding this is "optimism bias"—the widespread belief among college students that skin cancer is "someone else's disease," further attenuating behavioral motivation [11]. Of particular concern, 58.06% used sunscreen only occasionally during summer, exposing a cognitive blind spot regarding the fundamental fact of "year-round cumulative ultraviolet exposure" [12]—a correctable cognitive deficit rather than an immutable behavioral inertia. Therefore, narrowing the behavioral disconnect requires a dual-pronged approach: on one hand, correcting the misconception that "sun protection is only needed for summer outdoor activities"; on the other hand, facilitating behavioral initiation by reducing action costs (e.g., providing portable sunscreen samples, developing smartphone self-examination reminder applications).

The healthcare-seeking disconnect (~67 percentage points) carries the most direct clinical relevance. Although the 85.81% hypothetical preference for formal hospitals is reassuring, the fact that 81.29% had never actually consulted a doctor for a nevus-related concern indicates a formidable initiation barrier between "cognitive judgment" and "actual action." The core of this barrier lies in students' lack of explicit "medical consultation trigger criteria"—when should one visit a doctor for a nevus? Without the ABCDE criteria as a judgment framework, and given that the vast majority of melanocytic nevi remain asymptomatic throughout life, students cannot distinguish between "normal nevi" and "suspicious nevi," thus

defaulting to the strategy: ”asymptomatic = safe, no need to visit a doctor.” The key to resolving this issue is not repeatedly emphasizing ”seek timely medical care,” but rather equipping students with a concise, operable set of judgment criteria that transforms ”medical consultation decisions” from vague subjective judgments into clear comparisons against objective indicators.

The common root underlying all four layers of disconnect points in the same direction: the prevailing ”fear-based” paradigm of health education has become inadequate for current needs. Traditional messaging along the lines of ”melanoma is terrifying” indeed elevates risk awareness, but awareness does not equate to capability, and fear does not equate to action. Students ”know to be afraid” yet ”do not know what to fear, how to look, or when to go”—a state that may even generate ”learned helplessness”: since they cannot judge anyway, they might as well stop paying attention. The health education needs data from this study provide compelling supporting evidence: the top two desired content areas—”sun-protection methods” and ”self-examination techniques”—are both practical skills, rather than declarative knowledge such as ”what is melanoma.” Students themselves have clearly signaled: ”We want skills, not scare tactics” [13].

Based on the above analysis, we propose the following curriculum-based reform recommendations. First, integrate step-by-step instruction and case-based practice of the ABCDE criteria into the standard content of university physical education and health courses, ensuring that every student receives at least one systematic training session before graduation. Second, embed year-round sun-protection education into outdoor scenarios such as military training, physical education classes, and social practice activities, internalizing sun protection as a behavioral habit rather than an external task through ”scenario-based repeated exposure.” Third, develop lightweight digital tools deeply integrated with campus life contexts—such as monthly self-examination reminders embedded in campus applications, and simple change-detection functions based on photo comparison—to reduce the behavioral costs of self-examination and sun protection through technological means. The core logic underlying these measures is identical: transforming vague health advocacy into operable, repeatable, daily-life-integrated behavioral scripts, fundamentally bridging the gap between cognition and action.

This study is limited by its cross-sectional design and single-university sample. Future research should expand to multi-center, multi-regional college student samples and incorporate longitudinal tracking designs to evaluate the actual effectiveness of curriculum-based interventions.

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