Patient Preference and Adherence

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ORIGINAL RESEARCH

Knowledge, Attitude, Awareness, and Practice Regarding *Demodex* Mites Among the Thai Population

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Background: *Demodex* mites are common ectoparasites in humans and can cause various skin disorders known as demodicosis, ranging from nonspecific facial dermatitis to conditions resembling eczema, seborrheic dermatitis, folliculitis, and acne. Overgrowth of these mites can lead to pityriasis folliculorum, perioral dermatitis, blepharitis, and rosacea, significantly impacting skin health. This study aims to investigate the knowledge, attitude, awareness, and practice regarding *Demodex* mites in the Thai population and analyze the influencing factors associated with these aspects.

Methods: This study is a cross-sectional, analytical, observational study. All participants completed a questionnaire that covered sociodemographic characteristics, knowledge, attitude, awareness, practice regarding *Demodex* mites, and sources of health information. The survey was distributed via Google Forms, social media platforms, and paper questionnaires.

Results: Among 540 participants, the average age was 38.65 years, with 52% males. Mean scores for knowledge, attitude, awareness, and practice were 4.56 ± 2.56 out of 10, 17.37 ± 3.88 out of 25, 13.52 ± 3.59 out of 25, and 18.57 ± 3.73 out of 25, respectively. Only 23.33% had adequate knowledge, 50.56% had positive attitudes, and 10.93% had sufficient awareness. However, 66.11% exhibited active practices. Factors associated with active practice included being female (AOR = 1.95, p = 0.003), adequate knowledge (AOR = 1.63, p = 0.042), positive attitudes (AOR = 1.83, p = 0.002), and sufficient awareness (AOR = 4.12, p = 0.001).

Conclusion: The study clearly showed that the knowledge of *Demodex* mites among Thai people is limited. Although their attitudes toward these mites are fairy positive, their awareness remains alarmingly low. Nevertheless, they do engage in practices related to personal hygiene. Therefore, it is essential to improve this situation through effective educational campaigns to significantly enhance the management of skin diseases caused by *Demodex* mites.

Keywords: knowledge, attitude, awareness, practice, *Demodex* mite

Introduction

Demodex mites are prevalent ectoparasitic organisms that inhabit human hair follicles and sebaceous glands. Two species of *Demodex* mites are recognized in humans: *D. folliculorum*, which primarily resides in hair follicles, and *D. brevis*, which is predominantly found within sebaceous glands. They are commonly found on the face, especially around the nose, cheeks, forehead, and eyelashes. Adult mites are tiny, measuring only 0.3 to 0.4 mm in length for *D. folliculorum*, while *D. brevis* is slightly shorter. They feed on dead skin cells and sebum and complete their life cycle in about 2–3 weeks.[1]

Demodex mites can be transmitted from mother to infant or through direct skin-to-skin contact among family members or sexual partners and by sharing personal items used on the face, such as makeup brushes, towels, and bedding. These mites can also possibly be transmitted through contact with surfaces or objects that have previously been in contact with the skin of an infested person.[1,2]

When their density increases abnormally, these mites can become pathogenic and cause various skin disorders, known as demodicosis. These disorders can range from nonspecific facial dermatitis to conditions resembling eczema, seborrheic dermatitis, folliculitis, and acne.[1,3–6] The overgrowth of *Demodex* mites can also cause skin diseases such as

Received: 18 November 2024
Accepted: 15 January 2025
Published: 20 January 2025

pityriasis folliculorum, perioral dermatitis, pustular folliculitis, and rosacea, significantly impacting skin health.[7–12] In addition, *Demodex* mites have been identified as a plausible etiological factor in chronic blepharitis, conjunctival inflammation, and meibomian gland dysfunction within the field of ophthalmology. Its occurrence is associated with a range of atypical ocular conditions, including superficial corneal neovascularization, marginal corneal infiltration, phlyctenule-like lesions, and nodular corneal scars, particularly among individuals diagnosed with ocular rosacea.[13]

Research on the knowledge of *Demodex* mites among the Thai population has not been conducted before despite the prevalence of skin disorders caused by these mites.[6] This study aims to explore the knowledge, attitude, awareness, and practice regarding *Demodex* mites in the Thai population and analyze the factors that influence these aspects.

Materials and Methods

Study Design

This study was a cross-sectional, analytic, observational study. The participants were recruited between August 10, 2024, and October 10, 2024. The inclusion criteria were individuals aged between 18 and 75 years, residing in any region of Thailand, and willing to complete the questionnaires. The participants were asked to complete a self-administered questionnaire, which included questions about their sociodemographic characteristics, knowledge, attitudes, awareness, practices regarding *Demodex* mites, and their preference for obtaining health information. All participants who provided written informed consent before the survey were enrolled.

The sample size was determined using a standard statistical formula, with a confidence level of 95% ($z = 1.96$), an estimated proportion (p) of 0.5, and a margin of error (e) of 0.05, the formula $n = z^2 * p * (1 - p) / e^2$ gave us a sample size of around 385.

Questionnaire Development

The authors developed a comprehensive questionnaire specifically designed to assess knowledge, attitude, awareness, and practice related to *Demodex* mites. This questionnaire underwent a rigorous content validation process, reviewed by three dermatologists and ophthalmologists to guarantee its accuracy and relevance. Following the initial design phase, a pilot survey was carried out with a small sample group to assess the reliability of the questionnaire. The internal consistency, as measured by Cronbach's α coefficient, exceeded 0.8, confirming that the questionnaire met established standards for reliability. The finalized questionnaire consisted of six primary sections: sociodemographic characteristics of participants, knowledge, attitudes, awareness, practices, and sources of health information related to *Demodex* mites.

This survey was created using Google Forms and shared with potential participants through multiple social media platforms, including e-mail, Facebook, Line, and X. Paper questionnaires were distributed and collected simultaneously to enable more people to participate.

Evaluation and Analysis

Mean scores for each domain were calculated by aggregating individual responses. For the knowledge-based questions, participants provided binary responses (Yes or No), with correct answers assigned a score of 1 and incorrect answers a score of 0. These individual scores were then summed to derive total knowledge scores, with each question weighted equally. The results were reported as mean values along with their respective standard deviations. The questionnaire also employed a 5-point Likert scale to evaluate attitudes and awareness, with response options ranging from 1 (least) to 5 (most). A similar scale assessed practices, with ratings from 1 (never) to 5 (always). Overall attitudes, awareness, and practice scores were calculated by summing individual responses, with all items given equal weight. The aggregated data were then normalized to produce mean values and standard deviations.

Competency in each domain was operationally defined as achieving scores exceeding 70% of the maximum attainable score within the corresponding sections. The selection of a 70% threshold for competency is substantiated by its prevalent application in health and educational research contexts. This criterion strikes a judicious balance between leniency and rigor, thereby ensuring that participants exhibit a substantive level of knowledge, awareness, or practices. Furthermore, this criterion is consistent with the reliability outcomes of the pilot study, which indicated a Cronbach's alpha exceeding 0.8. Adopting this standard also enhances the comparability of the findings with existing literature in the field.

Statistical Analysis

Descriptive statistics were used to present the baseline characteristics of the study participants. Continuous data were summarized as means and standard deviations (SD), while categorical data were reported as frequencies and counts. The independent *t*-test and Mann–Whitney *U*-test examined differences in knowledge, attitude, awareness, and practice scores (KAAP scores) between males and females. The Chi-square test and Fisher's exact test were used to compare variations in major sources of health information across different age groups.

A multiple logistic regression analysis was employed to ascertain the factors associated with knowledge, attitudes, awareness, and practices while controlling for variables such as age, sex, and educational attainment. Variables with a p-value of less than 0.20 in the univariate analysis were incorporated into the multivariate model. The model's goodness of fit was assessed utilizing the Hosmer-Lemeshow test, whereas model discriminative ability was evaluated through the Area Under the Receiver Operating Characteristic (AUC) curve. An AUC value exceeding 0.7 was deemed indicative of acceptable discrimination. A p-value of less than 0.05 was regarded as statistically significant. All statistical analyses were performed using STATA version 14 software.

Results

A total of 540 questionnaires were collected for this study. The demographic characteristics of the participants are outlined in Table 1. The mean age of the participants was 38.65±12.87 years. Of the total participants, 281 (52%) were male and 259 (48%) were female.

Table 1 Demographic Characteristics of the Study Population

Characteristics	Total (n=540)	Male (n=281)	Female (n=259)	P-value
Age (years)				
Mean±SD	38.65 ± 12.87	37.71 ± 11.36	39.68 ± 14.26	0.2558
Median (IQR)	37(28–50)	37(29–44)	37(27–54)	
Education				
< Undergraduate	221(40.93)	173(61.57)	48(18.53)	<0.001
Undergraduate	243(45.00)	81(28.83)	162(62.55)	
Postgraduate	76(14.07)	27(9.6)	49(18.92)	
Occupation				
University Student	31(5.74)	10(3.56)	21(8.11)	<0.001
Medical student	29(5.37)	17(6.05)	12(4.63)	
Physician	52(9.63)	24(8.54)	28(10.81)	
Medical Staff	25(4.63)	6(2.14)	19(7.34)	
Employee	276(51.11)	189(67.26)	87(33.59)	
Government/Company officer	106(19.63)	26(9.25)	80(30.89)	
Others	21(3.89)	9(3.20)	12(4.63)	
The duration of daily internet and social media usage (hours)				
Mean±SD	5.24 ± 3.50	5.10 ± 3.59	5.40 ± 3.40	0.1149
Median (IQR)	4(3–6)	4(3–6)	5(3–7)	

Abbreviation: IQR, interquartile range.

https://doi.org/10.2147/PPA.S505615

Table 2 Mean Scores of Knowledge, Attitude, Awareness, and Practice Regarding Demodex Mites

Mean Scores of Knowledge, Attitude, Awareness, and Practice Regarding *Demodex* Mites				
Mean Scores of Participants	**Total (n=540)**	**Male (n=281)**	**Female (n=259)**	**P-value**
Mean scores of knowledge	4.56±2.56	4.18±2.47	4.98±2.60	<0.001
Mean scores of attitude	17.37±3.88	16.68±4.34	18.13±3.15	<0.001
Mean scores of awareness	13.52±3.59	13.63±3.80	13.39±3.35	0.6988
Mean scores of practice	18.57±3.73	17.86±4.10	19.35±3.10	<0.001

There were significant differences in education and occupation between males and females. Most males had less than an undergraduate degree (61.57%), while most females held an undergraduate degree (62.55%). Additionally, at the postgraduate degree, more were found in females (18.92%) than males (9.6%). In terms of occupation, it was found that the majority of males were employees (67.26%), while the majority of females were either employees (33.59%) or government/company officers (30.89%). Among female occupations, physicians and medical staff accounted for 18.15% of the cases, while males comprised 10.68%.

The mean scores for all participants in the knowledge, attitude, awareness, and practice questionnaires regarding *Demodex* mites were as follows: 4.56 ± 2.56 out of 10, 17.37 ± 3.88 out of 25, 13.52 ± 3.59 out of 25, and 18.57 ± 3.73 out of 25, respectively. Females significantly outperformed males in knowledge, attitude, and practice questionnaires, while there was no statistically significant difference in awareness between females and males. (Table 2).

23.33% of participants showed adequate knowledge, 50.56% displayed positive attitudes, 10.93% demonstrated sufficient awareness, and 66.11% exhibited active practices. The number of participants with adequate knowledge, positive attitudes, and active practices was significantly higher in females. In contrast, adequate awareness was similar between males and females, with no statistically significant differences. (Table 3).

Being female was significantly associated with having adequate knowledge. This relationship was statistically significant in both the univariate analysis (OR=1.92, p=0.002) and the multivariate analysis (AOR=1.72, p=0.019). Regarding education, postgraduation was initially significantly associated with having adequate knowledge in univariate analysis (OR=1.9, p=0.034). However, this association became statistically insignificant in the multivariate analysis (OR=1.44, p=0.307) (Table 4).

In terms of the positive attitudes, being female, having a postgraduate degree, and possessing sufficient awareness were significantly associated with having an adequate attitude, with an AOR of 2.21 (p<0.001), 2.08 (p=0.025), and 5.73 (p<0.001) respectively (Table 5).

Regarding awareness, only having positive attitudes was significantly associated with having sufficient awareness, with an AOR of 5.73 (p<0.001) (Table 6).

Table 3 Number of Participants Who Demonstrated Adequate Knowledge, Positive Attitudes, Sufficient Awareness, and Active Practices Regarding Demodex Mites

The Number of Participants who Demonstrated Adequate Knowledge, Positive Attitudes, Sufficient Awareness, and Active Practices Regarding *Demodex* Mites				
The Number of Participants	**Total (n=540)**	**Male (n=281)**	**Female (n=259)**	**P-value**
Adequate knowledge (scores ≥7)	126(23.33)	50(17.79)	76(29.34)	0.002
Positive attitude (scores ≥17.5)	273(50.56)	114(40.57)	159(61.39)	<0.001
Sufficient awareness (scores ≥17.5)	59(10.93)	35(12.46)	24(9.27)	0.235
Active practice (scores ≥17.5)	357(66.11)	165(58.72)	192(74.13)	<0.001

Table 4 Results of Logistic Regression Analysis of Adequate Knowledge Regarding Demodex Mites

Variable	No.	Univariate Analysis			Multivariate Analysis		
		OR	95% CI	P-value	AOR	95% CI	P-value
Adequate knowledge							
Female	76/126	1.92	1.28–2.88	0.002	1.72	1.09–2.72	0.019
Age (year)							
<30	41/126	1					
30–34	10/126	0.55	0.26–1.19	0.131	0.61	0.27–1.38	0.234
≥35	75/126	1.02	0.65–1.58	0.936	1.03	0.58–1.79	0.926
Education							
< Undergraduate	41/126	1					
Undergraduate	62/126	1.5	0.96–2.34	0.072	1.15	0.69–1.91	0.599
Postgraduate	23/126	1.9	1.05–3.45	0.034	1.44	0.72–2.89	0.307
Occupation							
Student	14/126	1					
Medical professional	20/126	1.15	0.53–2.53	0.723	1.03	0.43–2.49	0.944
Other	92/126	0.97	0.51–1.84	0.931	1.04	0.48–2.22	0.927
Time spent online							
<5 hours	62/126	1					
≥5 hours	64/126	1.12	0.75–1.66	0.592	1.12	0.74–1.71	0.593

Notes: "Student" refers to university and medical students. "Medical professional" refers to physicians and medical staff. "Time spent online" refers to the duration of daily internet and social media usage.
Abbreviations: OR, odds ratio; AOR, adjusted odds ratio; 95% CI, 95% confidence interval.

Active practice was not statistically significantly affected by age, education, occupation, or time spent online. However, being female as well as having adequate knowledge, positive attitudes, and sufficient awareness were significantly associated with the AOR of (AOR = 1.95, p = 0.003), 1.63 (p=0.042), 1.83 (p=0.002), and 4.2 (p=0.001), respectively (Table 7).

The Internet and social media were the most popular sources of health information for all age groups, accounting for 83.70%. Additionally, physicians were identified as the most reliable source of information, with a percentage of 63.89%, followed by Internet and social media at 23.70%. Individuals over 60 consume more traditional media such as television, radio, books, and magazines and receive information from physicians than younger people (Table 8).

Discussion

Demodex mites are known to cause a range of skin disorders. A study identified demodicosis as the 9th most common diagnosis in dermatologic consultations, indicating that dermatologists encounter as many demodicosis cases as atopic dermatitis.[5] The management of skin disorders caused by these mites poses a significant challenge in dermatology practices, primarily due to the limited knowledge about them among the general population and healthcare professionals.[1,3–5]

The findings of this study revealed that Thai individuals have limited knowledge, fairly positive attitudes, low awareness, and active practices regarding *Demodex* mites. Knowledge scores were similarly low compared to a previous

Table 5 Results of Logistic Regression Analysis of Positive Attitude Regarding Demodex Mites

Variable	No.	Univariate Analysis			Multivariate Analysis		
		OR	95% CI	P-value	AOR	95% CI	P-value
Adequate attitude							
Female	159/273	2.33	1.65–3.29	<0.001	2.21	1.47–3.31	<0.001
Age (Year)							
<30	92/273	1					
30–34	29/273	0.66	0.37–1.63	0.149	0.83	0.43–1.60	0.576
≥35	152/273	0.83	0.57–1.21	0.337	0.86	0.52–1.42	0.561
Education							
< Undergraduate	92/273	1					
Undergraduate	134/273	1.72	1.19–2.49	0.004	1.39	0.89–2.16	0.141
Postgraduate	47/273	2.27	1.33–3.87	0.003	2.08	1.09–3.98	0.025
Occupation							
Student	33/273	1					
Medical professional	39/273	0.83	0.43–1.65	0.613	0.61	0.27–1.34	0.218
Other	201/273	0.81	0.47–1.40	0.459	0.87	0.44–1.71	0.691
Time spent online							
<5 hours	137/273	1					
≥5 hours	136/273	1.09	0.78–1.53	0.601	1.01	0.69–1.46	0.955
Adequate knowledge	64/273	1.01	0.68–1.51	0.951	0.85	0.56–1.31	0.478
Sufficient awareness	48/273	4.96	2.51–9.79	<0.001	5.73	2.85–11.50	<0.001

Notes: "Student" refers to university and medical students. "Medical professional" refers to physicians and medical staff. "Time spent online" refers to the duration of daily internet and social media usage.
Abbreviations: OR, odds ratio; AOR, adjusted odds ratio; 95% CI, 95% confidence interval.

study on head lice in Thailand. Still, attitudes and preventive practices for head lice were higher than those for *Demodex* mites in this study.[14]

According to the questionnaires, only 23.33% of participants possess adequate knowledge about *Demodex* mites. A significant number of participants demonstrated a lack of knowledge about these tiny parasites on our skin, particularly our faces, and are prevalent across all age groups. Many individuals are uninformed about the skin problems caused by these mites, how to identify their presence on the skin, and how they are transmitted to people. Additionally, there are misconceptions about *Demodex* mites, with many people mistaking them for house dust mites, chicken mites, or scabies mites, which they are more familiar with. (Supplementary Table S1).

This outcome may be attributed to the failure to educate about these mites in schools, universities, and all communication channels, including online. While *Demodex* mites are occasionally mentioned in science documentaries or news articles about microscopic life on human skin, these sources have a limited audience. As a result, many people confuse these mites with other microscopic organisms. Some may have heard that tiny creatures live on human skin but are not familiar with the specific details of *Demodex*.

Table 6 Results of Logistic Regression Analysis of Sufficient Awareness Regarding Demodex Mites

Variable	No.	Univariate Analysis			Multivariate Analysis		
		OR	95% CI	P-value	AOR	95% CI	P-value
Adequate awareness							
Female	24/59	1.39	0.80–2.41	0.237	0.49	0.25–0.94	0.034
Age (year)							
<30	23/59	1					
30–34	6/59	0.63	0.25–1.64	0.347	0.51	0.18–1.44	0.207
≥35	30/59	0.69	0.39–1.23	0.214	0.53	0.26–1.08	0.079
Education							
< Undergraduate	25/59	1					
Undergraduate	25/59	0.90	0.50–1.61	0.722	0.95	0.47–1.97	0.909
Postgraduate	9/59	1.05	0.47–2.37	0.900	1.12	0.40–3.09	0.831
Occupation							
Student	5/59	1					
Medical professional	10/59	1.64	0.53–5.09	0.390	2.67	0.75–9.50	0.129
Other	44/59	1.35	0.51–3.54	0.545	2.22	0.74–6.65	0.155
Time spent online							
<5 hours	31/59	1					
≥5 hours	28/59	0.95	0.55–1.62	0.839	0.94	0.52–1.68	0.824
Adequate knowledge	13/59	0.92	0.48–1.76	0.803	0.99	0.50–1.98	0.994
Positive attitude	48/59	4.96	2.52–9.79	<0.001	5.73	2.85–11.51	<0.001

Notes: "Student" refers to university and medical students. "Medical professional" refers to physicians and medical staff. "Time spent online" refers to the duration of daily internet and social media usage.
Abbreviations: OR, odds ratio; AOR, adjusted odds ratio; 95% CI, 95% confidence interval.

Being female is only one significant factor associated with having adequate knowledge. The variations in education and occupation between females and males could account for this discovery. Most males had education levels below an undergraduate degree, whereas most females had completed an undergraduate degree. Furthermore, more females than males held postgraduate degrees. Regarding occupation, females had more white-collar and medical professions than males. However, when examining the association between each factor, it was found that having a postgraduate degree was statistically significant in the univariate analysis, but it lost its statistical significance in the multivariate analysis. Meanwhile, occupation was not found to be statistically significant.

This study also demonstrated that being a medical professional does not necessarily mean having more knowledge about *Demodex* mites than others. The study agreed with previous research, which showed that even dermatologists with many years of experience in general dermatology were not all familiar with diagnosing skin problems caused by *Demode*x mites; some had never diagnosed demodicosis in their practice.[14] A survey-based study in India revealed that most Indian optometrists, almost 70%, had not received any training in detecting and treating *Demodex* blepharitis.[15]

About half of the participants in the study displayed positive attitudes. They are concerned about the possibility of mites being on their skin and believe this could affect their health. Additionally, they consider it important to take steps to

Table 7 Results of Logistic Regression Analysis of Active Practice Regarding Demodex Mites

Variable	No.	Univariate Analysis			Multivariate Analysis		
		OR	95% CI	P-value	AOR	95% CI	P-value
Adequate preventive practice							
Female	192/357	2.01	1.39–2.90	<0.001	1.95	1.26–3.03	0.003
Age (Year)							
<30	110/357	1					
30–34	46/357	1.23	0.67–2.27	0.502	1.88	0.93–3.76	0.077
≥35	201/357	1.04	0.70–1.54	0.858	1.28	0.76–2.31	0.351
Education							
< Undergraduate	135/357	1					
Undergraduate	164/357	1.32	0.90–1.93	0.151	0.84	0.53–1.32	0.447
Postgraduate	58/357	2.05	1.13–3.72	0.018	1.14	0.57–2.31	0.708
Occupation							
Student	40.357	1					
Medical professional	60/357	1.76	0.82–3.77	0.143	1.36	0.57–3.25	0.485
Other	257/357	0.88	0.50–1.56	0.663	0.69	0.34–1.40	0.308
Time spent online							
<5 hours	187/357	1					
≥5 hours	170/357	0.88	0.61–1.25	0.481	0.8	0.54–1.18	0.264
Adequate knowledge	94/357	1.68	1.08–2.64	0.022	1.63	1.02–2.61	0.042
Positive attitude	205/357	2.28	1.58–3.29	<0.001	1.83	1.24–2.71	0.002
Sufficient awareness	52/357	4.29	1.90–9.64	<0.001	4.12	1.77–9.57	0.001

Notes: "Student" refers to university and medical students. "Medical professional" refers to physicians and medical staff. "Time spent online" refers to the duration of daily internet and social media usage.
Abbreviations: OR, odds ratio; AOR, adjusted odds ratio; 95% CI, 95% confidence interval.

prevent mite infestations. They also express an interest in learning more about these mites and emphasize the importance of educating students about them in schools (Supplementary Table S2). The study found that being female, having a postgraduate degree, and having sufficient awareness were significantly associated with having positive attitudes.

In the awareness dimension, only 10.93% of participants showed sufficient awareness. Most admitted to having limited knowledge about these mites, being unaware of their presence, and assuming they were at low risk of having them on their faces. There is a lack of awareness about the potential causes of facial skin problems related to these mites and the importance of testing for them (Supplementary Table S3). The study results clearly showed that having positive attitudes is significantly associated with having sufficient awareness.

The concepts of knowledge, awareness, and attitude are closely linked. Knowledge refers to understanding or information about a particular subject, while awareness involves recognizing an issue or fact. Attitude encompasses personal feelings, beliefs, or opinions. Both knowledge and awareness can impact personal attitudes toward a subject, but this relationship is not always straightforward.[16] Other factors can also influence attitude and awareness, as indicated in this study. Participants exhibited fairly positive attitudes despite insufficient knowledge and awareness.

Table 8 Source of Health Information

Major Sources for Obtaining Health Information	**Total (n=540)**	**Age Group**					**P-value**
		<30	**30–39**	**40–49**	**50–59**	**≥60**	
Internet and Social Media	452 (83.70)	143 (84.62)	108 (77.70)	97 (84.62)	97 (87.39)	27 (90.00)	0.214
Television and Radio	60 (11.11)	18 (10.65)	11 (7.91)	9 (9.89)	10 (9.01)	12 (40.00)	0.001
Books and Magazines	57 (10.56)	29 (17.16)	4 (2.88)	4 (4.40)	14 (12.61)	6 (20.00)	<0.001
Physicians	127 (23.52)	58 (34.32)	19 (13.67)	13 (14.29)	26 (23.42)	11 (36.67)	<0.001
Friends and Family	94 (17.41)	37 (21.89)	16 (11.51)	9 (9.89)	27 (24.32)	5 (16.67)	0.011
Reliable sources of health information	Total (n=540)	Age Group					P-value
		<30	30–39	40–49	50–59	≥60	
Internet and Social Media	128 (23.70)	39 (23.08)	30 (21.58)	27 (29.67)	24 (21.62)	8 (26.67)	0.684
Television and Radio	21 (3.89)	8 (4.73)	7 (5.04)	4 (4.40)	1 (0.90)	1 (3.33)	
Books and Magazines	18 (3.33)	4 (2.37)	6 (4.32)	2 (2.20)	4 (3.60)	2 (6.67)	
Physicians	345 (63.89)	111 (65.68)	89 (64.03)	56 (61.54)	73 (65.77)	16 (53.33)	
Friends and Family	27 (5.00)	7 (4.14)	7 (5.04)	2 (2.20)	8 (7.21)	3 (10.00)	
No reliable sources	1 (0.19)	0	0	0	1 (0.90)	0	

Around 66% of the participants showed active practices towards *Demodex* mites. Many participants reported washing their faces at least twice daily, cleaning their makeup tools at least once a week, refraining from sharing makeup with others and changing their pillowcases at least once a week. They also sought medical advice as their first step when experiencing facial skin problems (Supplementary Table S4). This study found that having adequate knowledge, maintaining a positive attitude, and possessing sufficient awareness were significantly associated with active practice. This could be why females engage in active practice more than males; they tend to demonstrate higher levels of knowledge and a more positive attitude, even though the level of awareness is similar between the genders.

The prevalent hot and humid tropical climate in Thailand contributes to frequent perspiration among the population. Consequently, it is common for Thai individuals to uphold high standards of personal hygiene, often engaging in facial washing and showering at least twice daily to maintain cleanliness and a sense of refreshment. Moreover, there is a significant emphasis on facial skincare and beauty, particularly among women. These behaviors likely stem from established hygiene and skincare routines rather than a specific intention to prevent *Demodex* mites infestation, as a previous study suggested that adherence to good hygiene practices and the avoidance of shared cosmetic products may help diminish the transmission of *Demodex* mites.[2]

The present study revealed that Thai people have limited knowledge about *Demodex* mites but hold a fairly positive attitude toward them. Consequently, there is a concerning lack of awareness about these mites. Despite this, they still actively practice preventive measures due to their regular hygiene habits.

Many studies have demonstrated that the knowledge-attitude-behavior model effectively influences human health behaviors through three continuous processes: acquiring knowledge, forming beliefs, and shaping behaviors.[17–19] To fill the gaps identified in this study, it is important to implement educational programs that provide comprehensive information about various aspects of the *Demodex* mites. This should include its characteristics, abnormal skin symptoms caused by these mites, prevention methods, and appropriate treatment.

The study showed that the internet and social media are the primary sources for obtaining health information, followed by physicians, friends, or family. Participants unequivocally consider physicians the most reliable source,

followed by the internet and social media. To enhance knowledge about *Demodex* mites, several strategies must be implemented. These must include providing comprehensive training for medical professionals to ensure they possess accurate knowledge and can effectively communicate this vital information to their patients. Additionally, organizing workshops and offering online courses or webinars can help keep medical professionals updated on the latest research and treatment options for skin conditions caused by these mites.

Launch an online educational campaign by creating shareable infographics and short videos that explain the impact of *Demodex* mites on health and how to prevent them. Utilize popular social media platforms like Line, TikTok, Facebook, Instagram, and YouTube to raise awareness and spread knowledge in society. Ensure that the educational materials are easily accessible to everyone. Tailor the content to target males and individuals with undergraduate or lower education, as they are likelier to have lower knowledge about these mites. Considering using traditional media such as television, radio, and magazines to reach individuals over 60. Incorporate comprehensive information about *Demodex* mites in health education curricula at schools, universities, and medical schools.

Even though research has not yet investigated whether increased public education can improve the outcomes of skin conditions caused by *Demodex* mites. However, a previous study showed that educating dermatologists increases their awareness in diagnosing skin disorders caused by *Demodex* mites. Furthermore, research on individuals with pediculosis capitis and scabies has indicated that enhanced knowledge can result in better prevention and significantly reduced infestation rates.[15,20,21]

Limitations of the Study

Some limitations should be considered in this study. First, this study is cross-sectional and can only establish correlations, not causation, due to the data being collected over a single period. Secondly, participants who complete questionnaires may differ from those who do not, particularly with online surveys that may not reach certain populations. Thirdly, using equal weighting for questionnaire items may not adequately reflect the relative importance of specific questions, which could limit the accuracy of the mean scores. Binary responses in the knowledge section may oversimplify complex understanding, potentially underestimating nuanced knowledge. Furthermore, participants may not accurately report their attitudes, awareness, or behaviors due to social desirability bias, recall bias, or confusion about the questions.

Conclusion

The study unequivocally demonstrated that Thai people possess limited knowledge, relatively positive attitudes, low awareness, and active practices regarding *Demodex* mites. It is crucial to enhance these aspects through public educational campaigns to improve clinical practice and markedly enhance the outcomes of skin diseases caused by these mites.

Data Sharing Statement

The original contributions presented in the study are included in the article/Supplementary material; further inquiries can be directed to the corresponding author.

Ethics Statement

The present study was conducted in accordance with the World Medical Association Declaration of Helsinki. All subjects had given their written informed consent, and the study protocol was reviewed and approved by the Ethical Research Committee of Mae Fah Luang University, approval number COE 165/2024.

Acknowledgments

The authors express their gratitude to Mae Fah Luang University for providing financial support for the publication charges of this work.

Funding

The authors declare that no financial support was received for the research.

Disclosure

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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