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Original article

Impostor phenomenon, mental health status and coping strategies among medical students in Southern Thailand

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Background: Impostor phenomenon is an internal experience in successful individuals who realize that their achievements are unintended, although their successes can be proven by objective evidence. The study of impostor phenomenon among medical students remains largely unexplored in Thailand, especially during the transitional period from traditional medical training to online training due to the COVID-19 pandemic.
Objectives: To determine the prevalence of impostor phenomenon, mental health and the coping strategies as well as to examine the factors related to impostor phenomenon among Thai medical students.
Methods: Two hundred and seventy-two subjects completed online questionnaires enquiring about sociodemographic characteristics and perception of social expectations in the role of a medical student as well as the Impostor Phenomenon Scale, Self-Esteem Scale, Anxiety and Depression Scale, and Coping Scale.
Results: The prevalence of impostor phenomenon among the surveyed medical students was 46.0%, while the prevalence of anxiety and depression was 14.1% and 5.2%, respectively. The subjects primarily employed confrontive coping strategies. The statistically significant predictors for impostor phenomenon were palliative coping strategy ($\beta = 4.478$, $P < 0.001$), self-esteem ($\beta = -1.038$, $P < 0.001$), anxiety ($\beta = 0.278$, $P = 0.004$) and perception of social expectations in the role of a medical student ($\beta = 0.032$, $P = 0.006$).
Conclusion: This information regarding the association between the impostor phenomenon, anxiety, self-esteem, coping strategies, and perception of social expectations in the role of a medical student may be beneficial for promoting better coping strategies and self-esteem as well as solving the impostor phenomenon problem among medical students.

Keywords: Anxiety impostor phenomenon, coping, depression, medical student, self-esteem.

Impostor Phenomenon (IP) is an internal experience in successful individuals, who realize that their achievements are unintended, although their successes can be proven by objective evidence.[1 – 2] They also have a fear of being exposed as incompetent; this has been found in various persons across different cultures and occupations, including university students.[3] However, the persistence of an individual's perception of IP might affect psychological disorders such as anxiety and depression.

The worldwide prevalence of IP in medical students has been reported at between 22.0% and 60.0%.[2] A study on American medical students revealed a prevalence of up to 51.0%, which occurred mostly during the transition from pre-clinical to clinical training.[4] Also, a study on Pakistani medical students reported a prevalence of mild-level IP at 7.3% in third-year to sixth-year students; meanwhile, that of severe-level IP was up to 64.5% in third-year students, up to 47.4% in fourth-year students, and up to 56.3% in sixth-year students.[5]

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Previous studies have suggested that IP is caused by numerous factors, depending on individual contexts such as gender [5], perception towards their family parenting style [6 – 7], personality[2], stressful life events, and coping strategies with fluctuating situations.[7 – 10]

Furthermore, several studies have shown that a decrease in satisfaction with life, a consequence of IP, is related to anxiety[11], depression[2], and low self-esteem.[12 - 13] Moreover, external factor that influence the impostor phenomenon among medical students is the expectations attached to the role and responsibilities of medical students to their society and community.[14]

The situation of the COVID-19 pandemic has impacted the pattern of traditional learning; it has led to less in-classroom learning and more online learning[15] or a mixed-pattern between traditional learning and online learning, especially in medical schools. A few studies have demonstrated the negative effect of online learning on mental health status among students, e.g., increased anxiety, burnout, and absenteeism due to the increased requirement of new technological skills, demand for productivity, and information overload.[16 – 18]

However, to our knowledge, a study on IP among medical students has yet to be carried out in Thailand, especially in the transitional period from traditional medical training to online training during the COVID-19 pandemic.

The objectives of this study were to determine the prevalence of IP, mental health status, and the related coping strategies as well as to examine the factors related to IP among medical students, and to help create an assistance plan and find ways to enhance their self-confidence, mental health, and problem-solving skills.

Materials and methods

This was a cross-sectional study using online questionnaires that was conducted at a medical school in sourthern Thailand from August to November 2021. The volunteers invitation poster was distributed to first- to sixth-year medical students via the student association of the Faculty of Medicine group line (online platform). Respondents of the invitation consisted of 322 medical students. To be included, one had to be a first - to sixth-year medical student, aged 18 years or above and enrolled in the 2021 academic year. We excluded 50 students, who were on academic probation (n = 13), had mental health conditions diagnosed by a physician (n = 37). Hence, a total of 272 subjects were recruited in the study.

The study protocol was approved by the Ethics Committee (EC) of the Faculty of Medicine, Prince of Songkla University (approval no. REC. 64-313-9-2). Informed consent by action was obtained from the subject and data were kept confidential.

Measurements

The online questionnaires were completed by all subjects. They consisted of the socio-demographic characteristics questionnaire, The Clance Impostor Phenomenon Scale[1], The Rosenberg Self-Esteem Scale (RSES)[19], The Thai Hospital Anxiety and Depression Scale (Thai HADS)[20], The Jalowiec Coping Scale (JCS),[21] and The Perception of Social Expectations in the Role of a Medical Student questionnaire.[1]

The Clance Impostor Phenomenon Scale was translated into its Thai version by Chaisaen A.[1] This instrument was used to evaluate the intellectual self-perception and characteristics of IP; it is composed of 20 items, and each answer is scored 1 to 5. A score of ≤ 40, 41 - 60, 61 - 80, and ≥ 81 indicated the presence of a few, moderate number, frequent and intense frequency of IP experiences. The cut-off point of ≥ 61 was interpreted as IP may be interfering with the person's life. The reliability of this instrument was assessed in terms of internal consistency measured using the Cronbach's alpha coefficient, which was 0.946.

The measurement of self-esteem was conducted via the Rosenberg Self Esteem Scale (RSES), Thai version.[19] The RSES is composed of 10 items that measure both positive and negative feelings about oneself. The total scores ranged 10 - 40 and were classified into 3 groups: low, moderate, and high self-esteem. The reliability of RSES is good, indicated by the Cronbach's alpha coefficient of 0.86.

To screen anxiety and depression, The Thai Hospital Anxiety and Depression Scale (Thai HADS)[20] was used. This tool consists of 14 items (a score of 0 - 3 for each item). A Cronbach's alpha coefficient of 0.86 indicated that it possesses good reliability. The questions were classified into anxiety symptoms and depressive symptoms. Scores ≥ 11 for each symptom were interpreted as indicating a clinical case of anxiety and depression.

The Thai version of The Jalowiec Coping Scale (JCS), translated by Taechakijkosol R. [21], measures how a person responds to stress according to the confrontive coping strategy, the emotive

coping strategy and the palliative coping strategy. (Confrontive strategies is an appraising and problem-solving during the stressful situation, emotive strategies is an emotional-focused domain on managing the emotional responses, and palliative coping strategies is an emotion-focused on reducing or relieving stress). Using a Likert Scale, each answer is scored 1 to 5. In our study, the sum total score was analyzed. The highest scores for each strategy indicated the coping strategy a person employed. The Cronbach's alpha coefficient of JCS was calculated at 0.86.

The Perception of Social Expectations in the Role of a Medical Student Scale (PSERM) was modified from The Perception of Social Expectations in the Role of a Ph.D. Student developed by Chaisaen A.[1] This questionnaire is composed of 6 items enquiring about medical ethics, medical knowledge, cognitive skills, interpersonal skills and responsibility, numerical analysis, communication, and information technology skills. Each answer is scored 1 to 6 with the higher scores indicating a higher perception level of social expectations. The scores were divided into three levels of perception, i.e., low, moderate, and high. The Cronbach's alpha coefficient of this test was determined at 0.93.

Statistical analysis

The statistical analyses were conducted using the R software. Descriptive statistics are represented in terms of mean, standard deviation (SD), median, interquartile range (IQR) numbers and percentages. The univariate analysis for the associations of independent variables with IP was carried out using unpaired Student *t* - tests, one-way analyses of variance (one - way ANOVA), and Spearman correlations. The significant factors obtained from the univariate analysis were entered into multiple linear regressions in order to examine factors predicting IP. A *P* - value of less than 0.05 was considered to indicate statistical significance.

Results

The sociodemographic data showed that most of the subjects were female (59.6%), with a mean age of 21.55 ± 1.80 years; an age range 18 - 28 years, a mean GPAX of 3.45 ± 0.33; a GPAX range 3.00 - 4.00, and who had no underlying diseases (85.7%). Among those with underlying diseases, allergies were the most often reported (9.9%). Most of subjects have been studied in clinic training year (60.3%). As a result of the COVID-19 pandemic, the most common learning pattern reported by our medical students was the mixture between online and practice/on-site (50.0%). The subjects' health behavior data related to the previous 3 months revealed that most of them usually consumed caffeine (89.3%). More than half of the subjects had not consumed alcohol in the 3 months prior to the survey, while 42.1% of them had consumed alcohol sometimes over the same period of time. Almost all of them had not smoked in the past 3 months; however, 1.8% of them had it sometimes and another 1.1% smoked usually. Their parental marital status was generally cohabitation/married (84.6%). Meanwhile, their paternal and maternal occupations were mostly self-employed and civil servants respectively. Predominantly, the subjects perceived the parenting style they were subjected to as authoritative (77.9%). Almost all of them had experienced stressful life events over the past 3 months (91.9%), which were primarily caused by study problems (81.2%). Their interpersonal relationships with colleagues, friends, advisors, instructors, ward staff and seniors were good and with academic officers were moderate.

Table 1. displays the data regarding the impostor phenomenon (IP), mental health status -including anxiety and depression - and coping strategies employed by our subjects to deal with such problems. The prevalence of individuals who experienced a few, a moderate amount, frequent, and an intense frequency of IP episodes were 4.4%, 49.6%, 39.4%, and 6.6%, respectively. On average, the subjects experienced moderate frequency level of IP, with mean scores of 60.74 ± 12.38. Moreover, confrontive coping strategies were primarily employed.

The comparison of IP scores according to the subgroups of sociodemographic data is shown in the Table 2. The identified sociodemographic factors that associated with IP scores significantly was the perception of a permissive parenting style. The comparison of psychosocial factors related to IP scores is demonstrated in Table 3. The factors significantly associated with IP were overall stressful life events, family problems, conflicts with close friends/lover, health problems, financial problems, study problems, and poor-to-moderate interpersonal relationships with friends.

The correlation between IP, self-esteem, mental health status, coping strategies, perception of social expectations, and GPAX are displayed in Table 4. Self-

esteem was found to significantly associate with IP; it showed a moderate degree of negative correlation (r = - 0.439, P < 0.001). On the other hand, mental health status, including anxiety and depression, exhibited a significant positive association with IP; a moderate degree of association was detected (r = 0.460, P < 0.001, r = 0.440, P < 0.001). In addition, the perception of social expectations was significantly positively associated with IP - a low degree of association was seen (r = 0.248, P < 0.001). Furthermore, the emotive coping strategy was significantly associated with IP - a moderate degree of positive correlation was found (r = 0.410, P < 0.001) and the palliative coping strategy was significantly associated with impostor phenomenon - a low degree of positive correlation was observed (r = 0.236, P < 0.001). Meanwhile, the confrontive coping strategy and GPAX were not associated with IP.

Our multiple linear regression analyses aimed to find associations between self-esteem, anxiety, depression, emotive coping strategy, palliative coping strategy, and perception of social expectation and IP.

The results showed that self-esteem, palliative coping strategy, anxiety, and perception of social expectation were associated with IP. These factors described 33.2% of IP variance, and the palliative coping strategy resulted the strongest predictor for IP (β = 4.478, P < 0.01) (Table 5).

Table 1. Prevalence of impostor phenomenon (IP), mental health status, and coping strategies of subjects.

	N	Percentage
Impostor phenomenon (IP)		
Mean (SD): Min-Max	60.74 (12.38): 30 - 100	
Few IP experiences	12	4.4
Moderate IP experiences	135	49.6
Frequent IP experiences	107	39.4
Intense IP experiences	18	6.6
Mental health status		
Anxiety (n = 271)		
Mean (SD): Min-Max	7.50 (3.74): 0 - 21	
Normal	233	86.0
Case	38	14.0
Depression		
Mean (SD): Min-Max	5.19 (3.56): 0 - 20	
Normal	258	94.9
Case	14	5.1
Coping strategies (n = 251)		
Mean (SD): Min-Max	3.61 (0.65): 1.85 - 5.00	
Confrontive	182	72.5
Mean (SD): Min-Max	2.86 (0.63): 1.44 - 4.78	
Emotive	36	14.3
Mean (SD): Min-Max	3.13 (0.57): 1.79 - 4.79	
Palliative	33	13.2

Table 2. Comparison of the sociodemographic data in relation to the impostor phenomenon (IP) scale.

	Impostor Phenomenon Scale					
	N	%	Mean (SD)	Statistic	*P*-value*	Post hoc test**
Gender						
Male	110	40.4	61.06 (13.24)	t (0.356)	0.722	
Female	162	59.6	60.52 (11.80)			
Age						
< 22 years	121	44.5	60.74 (12.83)	t (0.006)	0.995	
≥ 22 years	151	55.5	60.74 (12.05)			
Medical training						
Preclinic year	108	39.7	59.98 (13.09)	t (- 0.818)	0.414	
Clinic year	104	60.3	61.23 (11.90)			

Table 2. (Con) Comparison of the sociodemographic data in relation to the impostor phenomenon (IP) scale.

	Impostor Phenomenon Scale					
	N	**%**	**Mean (SD)**	**Statistic**	***P*-value***	**Post hoc test****
Pattern of learning						
Online	108	39.7	59.98 (13.09)	*F* (0.393)	0.675	
Practice/onsite	28	10.3	60.50 (13.84)			
Mixed	136	50.0	61.39 (11.52)			
Underlying disease						
Yes	39	14.3	61.49 (11.37)	*t* (- 0.407)	0.684	
No	233	85.7	60.61 (12.56)			
Caffeine consumption						
Yes	243	89.3	60.73 (12.34)	*t* (0.025)	0.980	
No	29	10.7	60.79 (12.97)			
Alcohol consumption (n = 271)						
Yes	123	45.4	62.07 (12.07)	*t* (- 1.547)	0.123	
No	148	54.6	59.74 (12.56)			
Smoking (n = 271)						
Yes	8	2.9	65.62 (14.48)	*t* (- 1.156)	0.249	
No	263	97.1	60.50 (12.27)			
Perceived parenting style (n = 253)						
Authoritative (1)	197	77.9	59.49 (12.28)	*F* (3.069)	0.011†	(1)VS(3)‡
Authoritarian (2)	20	7.9	63.30 (10.96)			
Permissive (3)	36	14.2	65.83 (12.33)			

† = *P* - value base on *t* - test, one way ANOVA test as appropriate
‡ = Significant pairwise comparison

Table 3. Comparison of psychosocial factors in relation to the impostor phenomenon (IP) scale.

	Impostor Phenomenon Score				
	N	**%**	**Mean (SD)**	***t***	***P* - value***
Stressful life events (overall)					
Yes	250	91.9	61.30 (11.89)	- 2.544	0.012†
No	22	8.1	54.36 (16.03)		
Family problems					
Yes	46	16.9	64.78 (11.30)	- 2.452	0.015†
No	226	83.1	59.92 (12.45)		
Conflicts with close friends/lover					
Yes	19	7.0	59.37 (15.35)	0.500	0.618
No	253	93.0	60.84 (12.16)		
Health problems					
Yes	55	20.2	63.80 (11.40)	- 2.065	0.040†
No	217	79.8	59.96 (12.54)		
Financial problems					
Yes	48	17.6	64.42 (9.65)	- 2.285	0.023†
No	224	82.4	59.95 (12.77)		
Study problems					
Yes	221	81.2	61.91 (11.74)	- 3.305	0.001‡
No	51	18.8	55.67 (13.85)		
Accommodation problems					
Yes	24	8.8	64.71 (12.22)	-1.650	0.100
No	248	91.2	60.35 (12.35)		
Relationship with colleagues (n = 270)					
Poor-to-moderate	62	23.0	61.87 (12.09)	0.916	0.361
Good-to-excellent	208	77.0	60.24 (12.41)		
Relationship with friends					
Poor-to-moderate	35	12.9	66.17 (12.35)	2.816	0.005‡
Good-to-excellent	237	87.1	59.94 (12.21)		

† = *P* - value base on *t* - test, one way ANOVA test as appropriate
‡ = Significant pairwise comparison

Table 4. Mean, standard deviation and bivariate correlation of study variables.

	Mean (SD)	Impostor phenomenon (1)	Self-esteem (2)	Mental health status		Coping strategies			Perception of Social Expectations (8)	GPAX (9)
				Anxiety (3)	Depression (4)	Confrontive (5)	Emotive (6)	Palliative (7)		
(1)	61.12 (12.32)	-								
(2)	29.19 (4.23)	$r_s = -0.439$ $P<0.001$	-							
(3)	7.48 (3.83)	$r_s = 0.460$ $P<0.001$	$r_s = -0.531$ $P<0.001$	-						
(4)	5.16 (3.62)	$r_s = 0.440$ $P<0.001$	$r_s = -0.650$ $P<0.001$	$r_s = 0.690$ $P<0.001$	-					
(5)	3.61 (0.65)	$r_s = -0.050$ $P = 0.423$	$r_s = 0.343$ $P<0.001$	$r_s = -0.221$ $P<0.001$	$r_s = -0.251$ $P<0.001$	-				
(6)	2.84 (0.63)	$r_s = 0.410$ $P<0.001$	$r_s = -0.359$ $P<0.001$	$r_s = 0.471$ $P<0.001$	$r_s = 0.392$ $P<0.001$	$r_s = 0.152$ $P = 0.015$	-			
(7)	3.12 (0.57)	$r_s = 0.236$ $P<0.001$	$r_s = 0.016$ $P=0.797$	$r_s = 0.115$ $P=0.067$	$r_s = 0.099$ $P=0.115$	$r_s = 0.473$ $P<0.001$	$r_s = 0.548$ $P<0.001$	-		
(8)	22.33 (4.95)	$r_s = 0.248$ $P<0.001$	$r_s = 0.018$ $P=0.770$	$r_s = 0.166$ $P = 0.007$	$r_s = 0.142$ $P=0.021$	$r_s = 0.211$ $P=0.001$	$r_s = 0.207$ $P=0.001$	$r_s = 0.219$ $P<0.001$	-	
(9)	2.42 (0.64)	$r_s = -0.053$ $P = 0.563$	$r_s = 0.068$ $P=0.455$	$r_s = 0.064$ $P=0.481$	$r_s = -0.029$ $P=0.750$	$r_s = -0.096$ $P=0.297$	$r_s = -0.141$ $P=0.125$	$r_s = -0.014$ $P=0.877$	$r_s = 0.032$ $P=0.727$	-

*r_s = Spearman correlation coefficient

Table 5. Predictors of impostor phenomenon.

Predictors	Impostor phenomenon				
	r^2	β	Standard error	*P* - value	95% CI
Self-esteem	0.211	-1.038	0.184	<0.001	-1.401, -0.675
Palliative coping strategy	0.278	4.478	0.207	<0.001	2.185, 6.771
Mental health status (anxiety)	0.310	0.608	1.164	0.004	0.200, 1.016
Perception of Social Expectations	0.332	0.380	0.136	0.006	0.112, 0.647
Constant		64.344	7.213	<0.001	50.135, 78.552

*The adjusted factors in the multiple linear regression model were depression, emotive coping strategy, family problems, health problems, financial problems, study problems, interpersonal relations with friends, authoritative parenting style, and permissive parenting style.

Discussion

Our study revealed that the 46.0% prevalence of impostor phenomenon (IP) among our medical student samples was almost identical to the finding reported by a study conducted among medical students in a private medical school in Malaysia (45.7%).[11] A similar prevalence was found in two other systematic reviews Thomas M. and Bigatti S. that focused on medical students, residents, and physicians and another study performed by Gottlieb M. *et al*. involving practicing physicians and physicians in training; the prevalences of these studies were 22.5 - 46.6%[22] and 22.0 - 60.0%[2], respectively.

The majority of our subjects had a moderate level of IP experiences. These findings were similar to the study Mascarenhas V, *et al*.[23] Another study involving American medical students conducted by Levent B, *et al*.[24] reported mean IP scores indicating moderate-to-frequent IP experiences; once more, this result is very close to what our study found.

Furthermore, this study discovered prevalence rates of depression and anxiety of 5.1% and 14.0%, respectively. In this case, our results differed from Zeng W, *et al*.[25] study their prevalence of depression and anxiety were 29.0% and 21.0%, respectively. These differences in outcome could possibly be due to our exclusion criteria - we excluded people with mental health conditions diagnosed by physicians. Thus, our prevalence was lower than in those studies. Regarding coping strategies, we found that 72.5% of respondents used the confrontive coping strategy. These findings were similar to those of an earlier study from Malaysia performed by Ismail M, *et al*.[26], which discovered that 73.1% and 14.4% of medical interns applied the confrontative coping strategy and the emotive coping strategy, respectively.

In regards to sociodemographic characteristics, gender did not significantly affect IP. This finding was similar to the study of Maqsood H, *et al*.[27] Conversely, the study by Rosenthal S, *et al*.[28] found that females had significantly higher IP scores than males. We also discovered that stressful life events, i.e., family problems, health problems, financial problems, and study problems, were variables that correlated with IP at a statistically significant level in our study. As far as interpersonal relationships with friends are concerned, this variable was found to be relevant to IP, which is similar to what a previous study performed by Rosenthal S, *et al*.[28] reported, i.e., lower IP scores obtained lower scores on loneliness.

The study by Fraenza C.[29] found that the online pattern of learning was associated with significantly lower IP scores than traditional learning among university students. Conversely, our study did not find significant differences in IP scores between these two learning patterns. However, a point worth mentioning that is a significant difference between our research and that conducted by Faenza C.[29], is that we studied medical students during the COVID-19 pandemic, which had been ongoing for two years by the time of our study period. The new learning style patterns during COVID-19 situation in Thai medical schools involve online training, mixed-training, and onsite training; online training consists of both computer-assisted instruction (CAI) and two-way communication via video conferencing. Thus, online learning might have not affected IP among our subjects in a meaningful way.

Regarding psychosocial factors, our study found that the permissive parenting style was significantly related to IP. This result was different from that of the study performed by Sonnak C. and Towell T.[30], which reported that the authoritarian parenting style led to a significant increase in IP prevalence. However, the study performed by Ishak Z, *et al*.[31] found that permissive parenting could have negative effects to

mental health concerns like anxiety and depression, which might related to IP. Furthermore, our study demonstrated the association between anxiety and IP.

Furthermore, our study revealed that depression was significantly correlated with IP. This was in concordance with the findings of a research by McGregor L, *et al*.[32], that medical students with higher IP scores had significantly higher scores of neuroticism/anxiety. In addition, our study found that lower self-esteem was significantly related to higher IP. This finding was similar to the studies by Ikbaal MY, *et al*.[11] and Thomas M. and Bigatti S.[22] study, focusing on medical students, residents, and physicians; they showed that IP was positively related to low self-esteem. Likewise, another study among medical students performed by Rosenthal S, *et al*.[28] found that lower self-esteem was significantly correlated with higher IP scores. One of the reasons for this could be that persons with high self-esteem tend to think that success comes from their own ability, intelligence, and skills.

We also found that the emotive and palliative strategies related to IP. Similarly, the study by Hutchins H, *et al*.[33] showed that individuals experiencing high levels of IP tended to apply indirect coping strategies such as the emotive and palliative styles of coping. Since indirect coping strategies do not eliminate stressors, i.e., the stressor persists in spite of the application of such strategies, this leads to emotional exhaustion and further feeling of IP.

Surprisingly, our study found that the perception of social expectations was positively correlated to IP; this correlation was not explored by any literature studying IP among medical students that we were able to access. According to the study by Stubbing EA, *et al*.[34] reported that medical student perceived the expectations of knowledge and competence, and the need to ensure trust, from others impact to their tension and their views on professionalism. Therefore, we believe that our result may constitute new knowledge in regard to studies on medical students. The inherent high perception of social expectation present in Thai medical students, i.e., in the Thai context, they, as doctors in the making, are expected to be successful by their family, social circle, and the society at large; this pressure may lead them to have higher perceived expectations from others compared to their peers.

It is accepted that the strongest negative predictor associated with IP is the palliative coping strategy. According to the Lazarus and Folkman theory [35], modifiable coping strategies together with the use of peer group support could alleviate cognitive and mood problems. We agree that this approach could be a key element in helping to tackle this problem. The employment of a confrontive strategy together with peer group support, opening up to a therapist, and sharing problems with parents might be beneficial to coping with stressors. However, self-esteem was a strong positive predictor associated with IP. It follows, therefore, that strategies that promote interpersonal relationships, social support, and social acceptance should be considered as means to enhance self-esteem. This information may be helpful for mental health professionals to support people who suffering from IP by evaluate them on the pattern of coping strategies. The boosting self-esteem could be a critical point in the prevention and/or successful management of IP. Moreover, psychotherapy or counseling may be benefits for them, to recognize feelings associated with IP and deal with feelings or solving them this problem.

This study has some limitations, however. Firstly, our cross-sectional study may have prevented the detection of a causal association between IP and anxiety. Thus, a longitudinal or analytic study is suggested to clarify this association. Secondly, using online questionnaires with a large number of questions might lead to incomplete questionnaires or collected data as well as to a lower response rate. However, this study has some strengths that are noteworthy. To our knowledge, there are no other studies on IP among Thai medical students.

Conclusion

Furthermore, our study examined the influencing factors associated with IP in many aspects such as sociodemographic and psychosocial factors. These results may help lead to solutions to manage IP, especially among this population group, in the future.

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Conflict of interest statement

Each of the authors has completed an ICMJE disclosure form. None of the authors declare any potential or actual relationship, activity, or interest related to the content of this article.

Data sharing statement

The present review is based on the reference cited. Further details, opinions, and interpretation are available from the corresponding authors on reasonable request.

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