

# Corticosteroid Phobia: A Key Barrier to Treatment in Young Women with Idiopathic Granulomatous Mastitis

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**Purpose:** Corticosteroids are recommended as a first-line treatment for idiopathic granulomatous mastitis (IGM), a disease that usually occurs in young women. Corticosteroid phobia is a fear of corticosteroids and one of the main reasons for poor treatment compliance. Despite the increasing recognition of corticosteroid phobia, there has been a lack of studies on this issue in IGM. This study was designed to investigate the prevalence and degree of corticosteroid phobia in IGM patients.

**Patients and Methods:** A cross-sectional survey was conducted among IGM patients who were receiving treatment at West China Hospital between June 2023 and December 2023. A modified version of Topical Corticosteroid Phobia Scale (TOPICOP) was used to assess the prevalence and degree of corticosteroid phobia in patients with IGM. Sources of drug information were also identified. Scores were expressed as mean  $\pm$  standard deviation. Independent *t*-test was used to compare the TOPICOP item scores between different categorical variables.

**Results:** A total of 50 IGM patients were included in the present study. The median global TOPICOP score was  $61.29 \pm 11.71\%$ . About 80% of patients represented with severe phobia, which their global TOPICOP score was above 50.0%. About 50% of participants showed fear of adverse effect of oral corticosteroids. About 89.6% of participants who received corticosteroid treatment showed their well to adhere to the doctor's advice. IGM patients with systemic symptoms were associated with higher scores in the behavior domain and/or global TOPICOP. Young, low educated, and unemployed individuals were more likely to have corticosteroid phobia ( $p < 0.05$ ). There was no difference in the scores based on skin redness, abscess formation, ulcer or fistula, initial treatment choice, or monthly household income. Medical professionals were the primary sources of information about corticosteroid.

**Conclusion:** Corticosteroid phobia was highly prevalent among the women with IGM, as well as the high treatment adherence. Women showed a high preference for non-corticosteroid therapies as alternative therapies. Providing more comprehensive and professional knowledge by physicians might be an effective method to attenuate corticosteroid phobia.

**Keywords:** corticosteroid phobia, treatment adherence, idiopathic granulomatous mastitis, breast

## Introduction

Idiopathic granulomatous mastitis (IGM) is an autoimmune breast disease mostly affecting young women.<sup>1</sup> IGM is a rare disease with the accurate disease incidence that remains uncertain. Recent studies reported a significant increase in incidence over the years.<sup>2</sup> Current treatment options for IGM primary include observation, corticosteroid and surgical excision. IGM is a localized inflammatory disease, it did not directly result in death but might result in breast abscesses and sinus formation. For refractory case, mastectomy is needed for disease control. Limited by relatively low prevalence and inadequate evidence, a definitive treatment algorithm for IGM is not available. Corticosteroids have been proven effective in reducing inflammatory responses and are recommended as the first-line treatment for IGM.<sup>3,4</sup> A recent meta-analysis showed a high complete response rate with corticosteroids (71.8%, 95% CI 67.1–76.3,  $I^2$  76.1%).<sup>5</sup> For more



severe or refractory cases, prolonged courses of high-dose corticosteroids may be necessary.<sup>6</sup> Our previous study reported a prospective cohort data that revealed a median treatment duration of methylprednisolone to be 116 days.<sup>7</sup> For refractory cases, corticosteroid treatment often lasts for many months, even years. Although corticosteroids are an effective treatment for IGM, their long-term side effects discourage extended use in young women. Drug-related adverse reactions, such as iatrogenic Cushing syndrome, hirsutism, menstrual irregularity, obesity, hypertension, and dysregulation of blood sugar are widely reported in patients using corticosteroids.<sup>8</sup> Obviously, it is difficult for young women to accept these changes, especially the physical appearance caused by corticosteroids.

Corticosteroid phobia, defined as excessive fear and anxiety regarding the use of corticosteroids, remains a prevalent issue encountered in clinical practice.<sup>9,10</sup> A survey conducted in Canada revealed a moderate level of corticosteroid phobia in women diagnosed with vulvar lichen sclerosus.<sup>11</sup> The reasons underlying corticosteroid phobia are multifaceted, including a lack of education, fear of side effects, misinformation and negative experience with corticosteroids. Healthcare communication, to a certain extent, contributes to the cultivation of corticosteroid phobia, such as insufficient counselling and overly cautious language regarding potential side effects. Corticosteroid phobia is also increasingly recognized as a significant factor contributing to poor treatment adherence in dermatology patients, particularly those suffering from chronic inflammatory skin diseases and allergic diseases, which require long-term corticosteroid usage.<sup>10,12</sup> For IGM patients, if they fail to receive timely and effective treatment due to corticosteroid phobia, the disease course will be significantly prolonged, leading to the formation of breast abscesses and sinus, and even necessitating invasive interventions such as abscess incision and drainage.<sup>13</sup> However, there has been a lack of studies on this issue in IGM treatment among young women.

The objective of this study is to assess the prevalence and degree of corticosteroid phobia for women with IGM and study the correlation of corticosteroid phobia with treatment adherence. This study aims to provide a better understanding of corticosteroid phobia and guides upcoming educational and counseling initiatives to enhance compliance with corticosteroid treatment among young women with IGM.

## Material and Methods

### Study Design and Participants

This cross-sectional study was carried out at the breast surgery clinic at West China Hospital between June 2023 and December 2023. Patients who have been diagnosed with IGM, regardless of disease stage or treatment status, were invited to complete a 30-minute structured questionnaire through face-to-face interviews. To avoid potential selection bias, patients who had prior use of corticosteroids unrelated to IGM were excluded. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and approved by the ethics board of West China Hospital (No. 2022415). All participants provided written informed consent to participate in the study and for their data to be published.

### Data Collection

Data were collected through a comprehensive questionnaire ([Supplementary Table 1](#)) that contained four parts. The first part gathered information on the participant demographics and disease characteristics. The second part was a mini-questionnaire that evaluates the level of corticosteroid phobia using a modified version of Topical Corticosteroid Phobia Scale (TOPICOP).<sup>14</sup> The mini-questionnaire consisted of 12 items assessing three domains of corticosteroid phobia. The knowledge and belief domain contains five items representing misconceptions about corticosteroids. The fear domain contains two items representing anxiety towards the use of corticosteroids. The behavior domain contains five items that represent reluctance to use corticosteroids. In the third part, participants who received corticosteroids were asked to comment on their cognition changes, compliance during treatment, and whether they had benefited or experienced side effects from these medications. The last part of the questionnaire investigated the sources of information on corticosteroids. Patients were allowed to provide more than one source of information.

## Study Tool

Minor modifications without disrupting the survey characteristics were made based on the TOPICOP scale and reviewed by experts. TOPICOP scale was originally crafted in English. It was translated into Chinese by a highly proficient bilingual expert in order to ensure the accuracy of translation and subsequently back-translated into English by a professional English-Chinese translator with no medical background. The newly acquired English version was valid after a thorough comparison with the original, confirming its accuracy in terms of meaning and concept coherence. Prior to its wide use, the translated scale was pilot-tested on 5 IGM patients to identify and rectify any potential issues, thereby enhancing its reliability and validity.

For the modified TOPICOP scale, the responses were scored on a five-point Likert scale (0 = totally disagree, 1 = do not really agree, 2 = neutrality, 3 = almost agree and 4 = totally agree). The maximum scores for knowledge and beliefs, fears, behavior, and global TOPICOP score were 20, 8, 20, and 48 points, respectively. The TOPICOP score and the domain subscores were calculated as a percentage of the maximum total achievable score, resulting in a score ranging from 0 to 100%. The global TOPICOP score is positively correlated with the degree of corticosteroid phobia. A TOPICOP score of  $\leq 50\%$  was considered mild-to-moderate phobia, and a score of  $>50\%$  was considered severe phobia.<sup>15</sup>

## Statistical Analysis

Descriptive statistics were used to analyze. The categorical variables were presented as frequencies and percentages, while the quantitative variables were presented as means. Independent *t*-test was used to identify binary variables. Statistical significance was set at *p* value  $<0.05$ . The data analysis was performed using SPSS statistics for Windows, version 26.

## Results

A total of 50 surveys were collected and analyzed, of which two individuals did not receive corticosteroid treatment. The mean age of participants was  $32.50 \pm 5.32$  years, of which 92% were aged over 25 years old. A large proportion of participants possessed a high education level, with 88% holding a high-school degree or above. The most common clinical presentation was a palpable lump (100%), followed by abscess formation in 36 cases (72%). The average size of lumps was 4.73 cm, of which 88% were 3 cm or greater. Systemic symptoms occurred in 16 patients (32%), with 5 patients presenting with fever, 5 presenting with arthritis, 3 presenting with erythema nodosum, 2 presenting with fever and arthritis and 1 presenting with erythema nodosum and arthritis (Table 1).

**Table 1** Baseline Characteristics and Population Characterization

Variables	Number of Cases (n)	Percentage (%)
Age (years)		
$\leq 25$	4	8
$>25$	46	92
Marital status		
Unmarried	3	6
Married	44	88
Divorced	3	6
Education level		
Primary school or junior middle school	6	12
Senior high school	9	18
Junior college	7	14
Undergraduate	21	42
Postgraduate and above	7	14

(Continued)

**Table 1** (Continued).

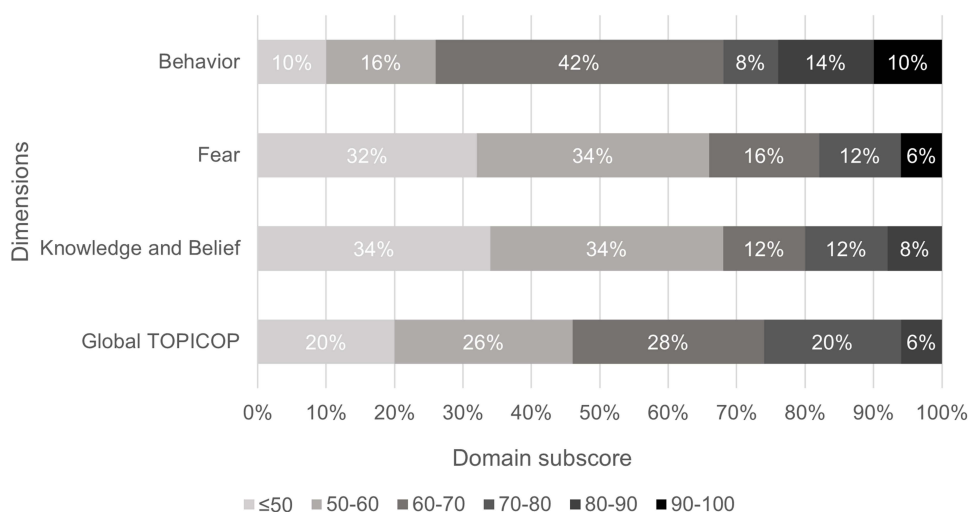
Variables	Number of Cases (n)	Percentage (%)
Occupation		
Unemployed	12	24
School student	2	4
Civil servant	5	10
Clerk	16	32
Professionals	3	6
Freelance	9	18
Others	3	6
Monthly household income (RMB yuan)		
<2,000	3	6
2,000–4,000	8	16
4,000–6,000	5	10
6,000–8,000	12	24
8,000–10,000	9	18
10,000–15,000	3	6
>15,000	10	20
Lump size (mm)		
<30	6	12
30–60	32	64
>60	12	24
Presentation		
Palpable lump	50	100
Skin redness	15	30
Abscess	36	72
Sinus or ulcer	14	28
Axillary node enlargement	3	6
Systemic symptom <sup>a</sup>	16	32
Global TOPICOP		
≤50%	3	6
>50%	47	94

**Notes:** <sup>a</sup>Systemic symptom includes fever, erythema nodosum and arthritis.

**Abbreviations:** RMB, Renminbi; TOPICOP, Topical Corticosteroid Phobia Scale.

Refer to previous studies, a TOPICOP score exceeding 50% is considered a severe degree of corticosteroid phobia.<sup>14</sup> In the present study, the global TOPICOP scores ranged from 39.58% to 87.50%, with a mean score of  $61.29 \pm 11.71\%$ , signifying a high level of corticosteroid phobia that cannot be neglected among all enrolled participants. Among these participants, 40 (80%) reported experiencing a severe corticosteroid phobia (scores > 50%), with only 10 (20%) showed mild-to-moderate phobia (scores ≤ 50%) (Figure 1).

The mean domain scores were  $56.40 \pm 14.74\%$  for knowledge and belief,  $50.50 \pm 21.42\%$  for fear and  $70.50 \pm 15.12\%$  for behavior, respectively. About 82% of participants agree that corticosteroids can cause weight gain, hirsutism and acne (17 (34%) “almost agree”, 24 (48%) “totally agree”). Almost half of the participants believed corticosteroids can lead to infections (11 (22%) “almost agree”, 7 (14%) “totally agree”) and make the condition more prone to recurrence (12 (24%) “almost agree”, 9 (18%) “totally agree”). There was widespread fear of adverse consequences about corticosteroid that 14 (28%) corticosteroid users almost agreed and 11 (22%) totally agreed about their fear of oral corticosteroids. Behaviorally, 74% of patient responses endorsed stopping using corticosteroids if any side effects occurred during the treatment. On the premise of ensuring treatment efficacy, about 46% of them would prefer topical or injectable corticosteroids, despite their more complex usage, over the convenience of oral corticosteroids. Moreover, a significant proportion of patients expressed their preference



**Figure 1** Distribution of global TOPICOP scores and subscores.

**Notes:** The global TOPICOP score is positively correlated with the degree of corticosteroid phobia. A TOPICOP score of  $\leq 50\%$  was considered mild-to-moderate phobia, and a score of  $>50\%$  was considered severe phobia.

for using traditional Chinese herbal medications (42% “almost agree” or “totally agree”) or more expensive but corticosteroid-free medicines (64% “almost agree” or “totally agree”).

Among the participants who received corticosteroid treatment, almost all participants would adhere to the doctor’s advice (20 (41.7%) “almost agree”, 23 (47.9%) “totally agree”). Despite the potential adverse effects, a majority of participants were willing to use corticosteroids for the rapid control of disease (19 (38%) “almost agree”, 16 (32%) “totally agree”). About 79.1% (38/48) of participants have benefited from corticosteroids and acknowledged the therapeutic effects of corticosteroids, yet 56.3% have also experienced side effects from corticosteroids. Furthermore, 29.2% of the participants who used corticosteroids believed that the adverse reactions of corticosteroids were unacceptable compared to the therapeutic effects and 12.5% would not choose corticosteroids again, even if there are currently no other effective treatments available (Table 2).

Further stratification showed that participants aged below 25 years tended to have higher level of corticosteroid phobia ( $p = 0.059$ ) and resistance to corticosteroid use ( $p = 0.028$ ) than those aged over 25 years. Similarly, participants aged below 25 years tended to score higher in other domains, but the difference was not statistically significant. Regarding systemic symptoms, we found that patients with fever, erythema nodosum or arthritis tended to achieve higher scores in global TOPICOP score ( $p = 0.013$ ). When participants were stratified according to clinical manifestations (such as skin redness, abscess formation, ulcer or fistula), no significant differences were observed in individual subscores or global TOPICOP score. Considering the level of education, participants with a bachelor’s degree or below had higher mean scores for knowledge and belief domain than those with a master’s degree or above ( $p = 0.012$ ), similarly in behavior domain ( $p = 0.006$ ) and Global TOPICOP ( $p = 0.029$ ). When comparing the mean scores in occupation, we found that unemployment was significantly associated with higher scores for global TOPICOP and all subdomains ( $p < 0.05$ ). Moreover, monthly household income and marital status were not found to be statistically significant in terms of mean TOPICOP score and their domains (Table 3).

Women obtained drug information through multiple communication channels. Physicians, network and drug directions were the primary sources of information about corticosteroids (Table 4). Fragmented information from other patients’ experiences or friends was the source of information obtained.

## Discussion

Corticosteroid is widely used in inflammatory disease and auto-immune disease. Corticosteroid phobia is an intricate and multifaceted phenomenon, primarily centered around concerns about the potential side effects of corticosteroids. Currently, only a few previous studies on corticosteroid phobia have been conducted on a population of children with

**Table 2** Questionnaire Components and Responses on Degree of Corticosteroid Phobia

Questions	Responses, n (%)					Scores, Mean ± SD
	Totally Disagree	Not Really Agree	Neutrality	Almost Agree	Totally Agree	
<b>1. Knowledge and belief Domain</b>						56.40 ± 14.74
Corticosteroids can lead to infections	1 (2)	13 (26)	18 (36)	11 (22)	7 (14)	
Corticosteroids can cause weight gain, hirsutism and acne	0 (0)	3 (6)	6 (12)	17 (34)	24 (48)	
Corticosteroids will affect future health	11 (22)	7 (14)	17 (34)	15 (30)	0 (0)	
Corticosteroids will induce osteoporosis and asthma	11 (22)	7 (14)	17 (34)	15 (30)	0 (0)	
Corticosteroids can make the condition more prone to recurrence	0 (0)	10 (20)	19 (38)	12 (24)	9 (18)	
<b>2. Fear Domain</b>						50.50 ± 21.42
I am afraid of oral corticosteroids	1 (2)	12 (24)	12 (24)	14 (28)	11 (22)	
Corticosteroids can be addictive	1 (2)	25 (50)	20 (40)	1 (2)	3 (6)	
<b>3. Behavior Domain</b>						70.50 ± 15.12
I will stop the treatment as soon as possible if any side effects occur during steroids treatment	0 (0)	4 (8)	9 (18)	22 (44)	15 (30)	
I need to learn about steroids through doctors, social media and books	0 (0)	0 (0)	5 (10)	26 (52)	19 (38)	
I would rather try TCM/herbal medications before using steroids	0 (0)	6 (12)	23 (46)	13 (26)	8 (16)	
I would rather choose topical or injectable corticosteroids with more complex usage compared to the convenience of oral steroids	1 (2)	6 (12)	20 (40)	9 (18)	14 (28)	
I would rather use something that does not contain corticosteroids even if it is more expensive	0 (0)	4 (8)	14 (28)	19 (38)	13 (26)	
<b>Global TOPICOP Score</b>						61.29 ± 11.71
<b>Addition questions <sup>a</sup></b>						
I have a better understanding of the therapeutic value and adverse reactions of corticosteroids compared to before treatment	0 (0)	0 (0)	10 (20.8)	21 (43.8)	17 (35.4)	
I need to control the progression of IGM as soon as possible, even if the use of corticosteroids has side effects	2 (4.2)	1 (2.1)	11 (22.9)	18 (37.5)	16 (33.3)	
I always adhere to the doctor's advice during the treatment	0 (0)	0 (0)	5 (10.4)	20 (41.7)	23 (47.9)	
I have benefited from steroids and acknowledged its therapeutic effects	0 (0)	1 (2.1)	9 (18.8)	21 (43.8)	17 (35.4)	
I have experienced side effects from corticosteroids	1 (2.1)	9 (18.8)	11 (22.9)	13 (27.1)	14 (29.2)	
I believe that the adverse reactions of steroids are unacceptable compared to the therapeutic effects	2 (4.2)	13 (27.1)	19 (39.6)	8 (16.7)	6 (12.5)	
I would not choose corticosteroids, even if there are currently no other effective treatments available	3 (6.3)	23 (47.9)	16 (33.3)	0 (0)	6 (12.5)	

**Notes:** <sup>a</sup>2 women did not received corticosteroids were not included in this data.

**Abbreviations:** IGM, idiopathic granulomatous mastitis; SD, standard deviation; TCM, traditional Chinese medicine; TOPICOP, Topical Corticosteroid Phobia.

**Table 3** Corticosteroid Phobia Outcomes Among the Socio-Demographic Characteristics of Participants

Variables	Knowledge and Belief Mean ± SD	Fear Mean ± SD	Behavior Mean ± SD	Global Topicop Mean ± SD
Age categories (years)				
≤25	63.75 ± 4.78	56.25 ± 31.45	86.25 ± 17.01	71.87 ± 9.08
>25	55.76 ± 15.16	50.00 ± 20.74	69.13 ± 14.34	60.37 ± 11.54
p-value	0.303	0.581	0.028	0.059
Marital status				
Single	66.66 ± 6.05	52.08 ± 16.61	75.00 ± 14.83	67.70 ± 5.06
Married	55.00 ± 15.05	50.28 ± 22.14	69.88 ± 15.23	60.41 ± 12.12
p-value	0.069	0.849	0.443	0.155
Education level				
Bachelor or below	58.48 ± 13.25	50.58 ± 22.65	71.86 ± 15.77	62.74 ± 11.65
Master or above	43.57 ± 17.96	50.00 ± 12.50	62.14 ± 5.66	52.38 ± 7.92
p-value	0.012	0.948	0.006	0.029
Occupation				
Employed	53.61 ± 14.71	45.13 ± 18.48	67.08 ± 14.11	57.81 ± 10.27
Unemployed	63.57 ± 12.62	64.28 ± 22.92	79.28 ± 14.52	70.23 ± 10.66
p-value	0.030	0.003	0.009	0.000
Monthly household income (RMB yuan)				
≤8,000	56.42 ± 12.75	48.21 ± 22.74	68.92 ± 15.41	60.26 ± 11.13
>8,000	56.36 ± 17.26	53.40 ± 19.73	72.50 ± 14.86	62.59 ± 12.55
p-value	0.988	0.400	0.413	0.491
Lump size (mm)				
≤40	56.13 ± 15.11	52.84 ± 20.38	67.27 ± 12.69	60.22 ± 10.81
>40	56.60 ± 14.72	48.66 ± 22.39	73.03 ± 16.57	62.12 ± 12.51
p-value	0.921	0.499	0.184	0.574
Skin redness				
Yes	59.33 ± 14.86	46.66 ± 28.53	69.33 ± 19.62	61.38 ± 15.60
No	55.14 ± 14.72	52.14 ± 17.80	71.00 ± 13.04	61.24 ± 9.87
p-value	0.362	0.413	0.725	0.970
Abscess formation				
Yes	55.00 ± 15.72	48.26 ± 22.98	68.88 ± 15.12	59.66 ± 12.13
No	60.00 ± 11.60	56.25 ± 16.07	74.64 ± 14.86	65.47 ± 9.72
p-value	0.286	0.240	0.231	0.116
Ulcer or fistula				
Yes	55.71 ± 15.67	51.78 ± 28.10	74.64 ± 15.74	62.94 ± 13.75
No	56.66 ± 14.58	50.00 ± 18.66	68.88 ± 14.78	60.64 ± 10.97
p-value	0.840	0.794	0.231	0.539
Systemic symptom				
Yes	62.18 ± 12.37	57.81 ± 24.94	75.93 ± 14.16	67.18 ± 11.29
No	53.67 ± 15.14	47.05 ± 18.98	67.94 ± 15.08	58.51 ± 11.00
p-value	0.056	0.098	0.081	0.013
Initial treatment				
Yes	54.33 ± 15.79	53.33 ± 20.74	73.33 ± 14.34	62.08 ± 12.55
No	59.50 ± 12.76	46.25 ± 22.25	66.25 ± 15.63	60.10 ± 10.54
p-value	0.228	0.256	0.105	0.564

**Abbreviations:** RMB, Renminbi; SD, standard deviation; TOPICOP, Topical Corticosteroid Phobia.

atopic dermatitis.<sup>10,16</sup> In the present study, we focus on IGM, a disease of unknown etiology that mostly affects young women.<sup>17</sup> Corticosteroids play a crucial role in disease control, while their side effects might discourage their widespread usage.<sup>18</sup> The prevalence and degree of corticosteroid phobia is a practical question in daily clinical practice.

All enrolled patients experienced varying extents of corticosteroid phobia, with 80% reporting severe corticosteroid phobia. It is widely known that psychological factors can influence the secretion of female sex hormones, leading to

**Table 4** Source of Information

Source	Number of Cases (n)	Percentage (%) <sup>a</sup>
Medical professionals	43	86
Patients	10	20
Network	25	50
Package leaflets	4	8
Drug directions	17	34
Friends and/or relatives	11	22

**Notes:** <sup>a</sup>Percentages may add up to >100% since participant could choose more than one option.

endocrine system disruption and related diseases. Due to the accelerated pace of life and the rising mental pressure, the expanding of anxiety population may also be a reason for the recent surge of IGM incidence rates. Meanwhile, the utilization of antipsychotic medications may be associated with hyperprolactinemia, which is closely related to the development of IGM.<sup>19,20</sup> Although the specific mechanism remains unclear, anxiety is one of the high-risk factors for IGM occurrence and recurrence.<sup>21</sup> Previous studies have found that negative emotions are closely associated with elevated proinflammatory cytokine levels, inducing and promoting inflammatory reactions.<sup>22,23</sup> Therefore, maintaining a positive and stable emotional state in patients may be a crucial part of disease control.

In the subgroup analysis, we observed a notable age disparity in concern towards corticosteroids, with participants aged below 25 years scoring significantly higher than those aged over 25. On the contrary, previous researches found no association between age and corticophobia.<sup>14,24,25</sup> This disparity might stem from the fact that younger women are more concerned about the adverse effects of corticosteroids on their appearance, including moon face, weight gain, acne, and hirsutism, which they perceive as detrimental to their physical appearance. Furthermore, we found that patients with systemic symptoms had a higher level of corticophobia. Severe disease conditions may exacerbate patients' anxiety and psychological stress, thereby forming a negative feedback effect with corticosteroid phobia. However, corticosteroid phobia was not necessarily correlated with the severity of disease.<sup>26</sup>

In previous studies, corticosteroid phobia is being increasingly recognized as playing a key role in poor treatment adherence.<sup>27</sup> It is interesting to note that although the majority of patients in this study showed corticosteroid phobia, virtually all of them adhered to medical advice to receive corticosteroid therapy, hoping to achieve effective disease control within a short period. Several potential explanations could be postulated for this observation. Patients psychologically tend to trust more and are more willing to follow the treatment advice of doctors in renowned tertiary hospitals, even if they still feel panic about corticosteroids. Moreover, almost all the study participants reported the information came from medical professionals, who probably have provided a detailed description of corticosteroids. This potentially has led to a certain degree of reassurance among patients.

To address corticosteroid phobia among younger patients and those with systemic symptoms, several specific strategies can be implemented. Developing age-appropriate educational materials that focus on addressing appearance-related concerns among younger patients. Providing training for medical professionals on how to communicate more effectively about corticosteroid risks and benefits. Establishing a shared decision-making approach that involves patients in treatment planning. This can be achieved by providing patients with information about their treatment options and respecting their preferences and concerns. By involving patients in the decision-making process, we can help reduce their anxiety and increase their adherence to treatment. In any case, conducting education among patients to alleviate their concern towards corticosteroids remains a pivotal strategy in enhancing treatment adherence.<sup>28,29</sup>

In our previous study, an overall response rate of 80.7% was observed in IGM patients treated with methylprednisolone.<sup>7</sup> A meta-analysis also demonstrated a high complete remission rate with the use of corticosteroids.<sup>30</sup> In our series of patients, 79.1% reported benefiting from corticosteroid therapy and acknowledged the therapeutic effects of corticosteroids. Nevertheless, participants also expressed a preference for more complex or costly treatments to avoid

potential adverse effects of corticosteroids, provided that comparable therapeutic effects can be achieved. Apart from corticosteroids, treatment options for IGM encompass non-corticosteroid immunosuppressive agents, surgery, Chinese herbs, antibiotics, as well as observation. Non-corticosteroid immunosuppressive agents showed benefits in more severe or refractory cases, particularly among patients who were intolerant or resistant to taking corticosteroids.<sup>31</sup> In our practice, Chinese herbal medicine is recommended for masses with small in size or localized refractory mastitis. Watch-and-wait approach was recommended for patients exhibiting mild symptoms, as IGM is typically a self-limiting course that may resolute spontaneously.<sup>2</sup> More high-quality prospective studies are required urgently to further explore how patients can be stratified for effective treatment strategies.

Despite the question of patient attitudes to corticosteroids is frequently asked in consultation, the origins of these fears are seldom delved into. The sources where patients acquire information about corticosteroids may be targetable for intervention to increase adherence to treatment regimens. In the present study, we reported that the primary source of information about corticosteroid is medical professionals. The role of information provided by medical professionals was underscored in previous studies. Information of poor quality, lacking in clarity or containing discrepancies breeds corticosteroid phobia.<sup>16</sup> A Belgium study revealed prominent corticosteroid phobia among healthcare professionals, particularly pharmacists and general practitioners, probably stemming from insufficient knowledge of corticosteroids.<sup>32</sup> In order to improve patient compliance, continuing education of medical professionals is suggested. For healthcare providers, it is essential to transfer professional and correct information about corticosteroids to patients appropriately.

Our study had limitations. The findings of this study may have limited generalizability to other populations or healthcare settings due to its exclusive focus on a single medical institution. The limited sample size may not comprehensively reflect the attitudes towards corticosteroids among the broader population. Moreover, this study is a nonprospective cross-sectional study and cannot evaluate the potential impact of corticosteroid phobia on IGM treatment, particularly on treatment compliance. This issue may be addressed in a future prospectively designed study that expands to multi-center or includes diverse populations for broader applicability.

## Conclusion

A significant level of corticosteroid phobia was observed in patients diagnosed with IGM. Corticosteroid phobia was more prevalent among patients who are younger, unemployed, or display systemic symptoms. The contradiction between high phobia levels and adherence rates indicated an urgent demand for treatment among IGM patients. The search of effective non-corticosteroid therapies for treating IGM is needed in the future. The information source of corticosteroids may be intervention targets for reducing corticosteroid phobia. Providing more comprehensive and professional knowledge by physicians might be an effective method to mitigate corticosteroid phobia. Thus, it is essential to provide training for medical professionals, especially those working in tertiary hospitals, on how to communicate more effectively about corticosteroid risks and benefits. Indeed, finding effective non-corticosteroid therapies for treating GLM is also an urgent clinical issue to be addressed.

## Ethics Approval and Consent to Participate

This study was reviewed and approved by the ethics board of West China Hospital (No. 2022415). All participants provided written informed consent to participate in the study and for their data to be published.

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## Disclosure

The authors report no conflicts of interest in this work.

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