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ALLERGIC DISEASES: A REVIEW OF SELECTED NATURAL REMEDIES AND STUDENTS SURVEY

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ABSTRACT

Allergic diseases refer to a group of conditions caused by an overreaction of the immune system (usually IgE-mediated) to harmless substances known as allergens. The global rise in allergic diseases has paralleled population growth, presenting a major challenge in reducing morbidity. Despite the widespread prevalence and impact of allergies on quality of life, healthcare professionals often lack sufficient knowledge regarding alternative and complementary therapies, particularly herbal remedies. This study aimed to (1) review the existing literature on botanicals with potential anti-allergic properties—specifically quercetin, nettle, eyebright, and butterbur—and (2) assess the knowledge and perceptions of first-year pharmacy students concerning the use of these herbal therapies in allergic conditions. Methods: A literature review was conducted to summarize current evidence, followed by the development and distribution of a structured online survey to pharmacy students enrolled in a Drug Information course. The survey included demographic questions, five knowledge-based items, and five opinion-based items. Results: A total of 46 students participated, yielding a 92% response rate. The findings showed a high level of knowledge about commonly studied herbs such as butterbur and quercetin (over 85% correct responses), but lower awareness of nettle and eyebright (57.6% and 62.5%, respectively). While students demonstrated a solid understanding of certain herbal treatments, their attitudes were generally skeptical: only 25.8% expressed confidence in the safety of herbal remedies compared to over-the-counter

medications, and just 5.9% were willing to recommend herbal therapies. Cross-tabulation analysis revealed significant associations between students' geographic background and their knowledge and attitudes toward herbal therapies (p-values < 0.05). Conclusion: In conclusion, while pharmacy students demonstrated reasonable knowledge of certain herbal therapies for allergies, their overall skepticism and limited confidence in their use highlight a clear need for enhanced education on evidence-based complementary and alternative medicine. Strengthening this component within the pharmacy curriculum may help prepare future healthcare providers to make informed, balanced decisions regarding herbal treatments.

KEYWORDS: Allergy, Herbals, Pharmacy, Students, Survey, butterbur, quercetin, nettle, and eyebright.

INTRODUCTION

Allergic rhinitis, commonly known as hay fever, is an allergic response triggered by environmental allergens such as pollen, dust mites, pet dander, or mold spores. The disease mechanism involves three key steps: sensitization, subsequent exposure, and inflammation. During sensitization, genetically susceptible individuals produce allergen-specific IgE antibodies in response to initial exposure. Upon subsequent exposure, the immune system recognizes the allergen and releases histamines and other inflammatory mediators, leading to symptoms such as nasal congestion, sneezing, and eye irritation. A thorough understanding of this complex mechanism is essential for developing effective prevention and treatment strategies.

The prevalence of hay fever varies based on region and climate; it is estimated that 10–30% of the global population is affected. The condition presents in both seasonal and perennial forms, significantly impacting the quality of life and imposing a substantial economic burden. Increased healthcare costs, lost productivity at work or school, and medication expenses contribute to the overall societal impact of allergic rhinitis.

Herbal therapies have been widely used in various parts of the world as alternative treatments for allergic rhinitis -is general (Passalacqua, 2006). Despite their historical use, there remains a knowledge gap among general physicians, otolaryngologists, and immunologists regarding their efficacy and mechanisms (Frieri, 2001). This identifies the need for further research and documentation by healthcare professionals and pharmaceutical scientists to better understand

and validate the potential benefits of herbal therapies in managing allergic rhinitis conditions. The most common herbs that are used for allergic disease and the ones included in this study are described below.

Butterbur (Petasites hybridus is a perennial shrub historically used for wrapping butter in warm weather, has been extensively researched for its potential to alleviate hay fever symptoms. Clinical studies indicate that butterbur extract effectively reduces allergic rhinitis symptoms with fewer side effects compared to conventional treatments. Topical butterbur regimens are widely recommended, and studies suggest no cytotoxicity from its application on nasal cells (Özergin, 2023). In addition to its anti-allergic properties, petasins—active compounds in butterbur—have been studied for their effectiveness in treating migraines and tension headaches (Borlak, 2022). Found in Europe, Asia, and parts of the U.S., butterbur contains petasin and isopetasin, which possess anti-inflammatory properties that help reduce nasal congestion, sneezing, spasms, and swelling.

A recent study by Lim XY et al. (2024) assessed butterbur's effectiveness in managing allergic rhinitis, reporting that it may improve nasal symptoms and overall quality of life. However, the evidence was rated as low to moderate in certainty, underscoring the need for further high-quality studies. An earlier study by Jackson CM et al. (2004), published in Clinical and Experimental Allergy, compared butterbur extract to fexofenadine and placebo in patients with perennial allergic rhinitis. The results indicated that butterbur was as effective as fexofenadine in relieving allergy symptoms, without the sedative side effects.

Quercetin: is a flavonoid-rich antioxidant present in various fruits, vegetables, and plants. It has been studied for its ability to stabilize mast cells and inhibit histamine release, potentially reducing allergy symptoms. Its efficacy in relieving hay fever symptoms varies among individuals, requiring further research for conclusive evidence (Jafarinia, 2020). Additionally, quercetin exhibits strong antioxidant and anti-inflammatory properties, contributing to overall immune support.

A comprehensive review by Pratap K et al. (2020), explores the therapeutic potential of various natural bioactive compounds—quercetin among them—in managing food allergies. The authors emphasize quercetin’s notable anti-inflammatory and immunomodulatory effects. Complementing this, a systematic review of randomized controlled trials by de Almeida Brasiel PG (2022), assessed the role of flavonoids like quercetin in allergy

treatment. While quercetin showed promise in alleviating allergic symptoms, the overall evidence was rated as low to moderate quality, indicating a need for more robust clinical studies.

Nettle (Urtica dioica): has a long history in complementary and alternative medicine (Thornhill, 2000). Native to Eurasia and widely distributed throughout temperate regions, including the U.S. (Whitney, 2006), nettle leaf extracts are commonly used to relieve allergic rhinitis symptoms. Studies suggest that nettle extract may have anti-inflammatory properties, reducing symptoms such as sneezing and nasal congestion, while being generally safe for most individuals (Bakhshaee, 2017).

A review by Bakhshaee M et al. (2017), explored the use of nettle (Urtica dioica) in allergic conditions. The authors noted that while nettle has a long history of traditional use for allergy relief, scientific evidence supporting its efficacy remains limited. They emphasized the need for further research to confirm its effectiveness and safety.

Eyebright (Euphrasia): has traditionally been used to treat ocular symptoms associated with hay fever, although robust studies on its efficacy have been limited since 2003. Euphrasia-based eye drops have been employed in anthroposophical medicine for over 70 years for conditions such as inflammatory and catarrhal conjunctivitis. A clinical trial (Stoss, 2000) on Euphrasia single-dose eye drops in conjunctivitis suggests that ocular allergies are a common concern among allergy sufferers, prompting many to seek complementary and alternative medicine. A review by Leonard Bielory et al. (2003) highlights herbal therapies, alternative immunotherapy, and behavior modification as effective approaches for managing ocular allergy symptoms.

A cohort clinical trial by Stoss et al. (2000), evaluated the effectiveness of eyebright (Euphrasia) eye drops in treating various conjunctival conditions, including allergic conjunctivitis. The study found that many patients experienced full recovery or significant improvement without serious side effects. However, the absence of a control group and limitations in study design reduce the strength of the findings. More rigorous, controlled trials are needed to confirm the therapeutic value of eyebright for allergic conjunctivitis.

Healthcare professionals' understanding of current allergy research and treatment guidelines remains limited in many areas. Identifying challenges in diagnosis, testing, treatment, and

patient education is essential to advancing allergy care. Strengthening provider knowledge in these aspects may help close existing gaps and improve patient outcomes. Despite the high prevalence and significant impact of allergies on quality of life, gaps exist in fully understanding the role of herbal therapies. While some clinical trials have reported beneficial effects of botanicals such as quercetin, nettle, eyebright, and butterbur in alleviating symptoms of allergic rhinitis, placebo-controlled studies often yield comparable outcomes, making it challenging to determine the true efficacy of these herbs.

This study had two primary objectives: first, to review key botanicals with potential anti-allergic properties—specifically butterbur, quercetin, nettle, and eyebright—and summarize the existing scientific literature and clinical trial data supporting their use. Second, it aimed to assess the knowledge and perceptions of first-year pharmacy students regarding the use of these herbal remedies in allergic conditions. The findings highlight a need to strengthen education on evidence-based herbal therapies within the healthcare curriculum. Ultimately, the goal was to identify existing gaps in awareness and highlight the need for improved education on evidence-based herbal therapies within the healthcare curriculum.

METHODS

A literature review was first conducted to examine the beneficial effects of the herbs outlined above. Based on the findings, a survey questionnaire was developed and distributed to pharmacy students as part of their coursework in the Drug Information course. The survey consisted of three sections. The first section included demographic questions, while the second section contained five knowledge-based questions assessing familiarity with herbal therapies for allergic rhinitis. The third and final section included five opinion-based questions evaluating participants' attitudes toward the potential benefits of these therapies. The survey was administered online, and all students were invited to participate. Responses were analyzed using SPSS for descriptive and cross-tabulation statistical tests.

RESULTS

A total of 46 pharmacy students participated in the survey, yielding a 92% response rate. Table 1 presents demographic information, including gender, age distribution, and geographical background of the respondents. Among the participants, 65% identified as female (n=30). In terms of age, the majority (45.7%, n=21) were between 18 and 24 years old. Regarding geographic origin prior to entering the Howard University Pharmacy Program, the data reflect a diverse background: 13% were from Washington, D.C. (DC),

32.6% from Maryland (MD), 2.2% from Virginia (VA), and the largest group—34.8%—from other states. Additional demographic including work experience and highest education level attended details are presented below.

Table 1: Sociodemographic Characteristics of Participants (N=46).

Variables		N (%)
Gender	Male	10 (21.7)
	Female	30 (65.2)
	Non-Binary/Third Gender	0 (0.0)
	Prefer not to say	6 (0.13)
AGE	18 - 24	21(45.7)
	24 - 30	15 (32.6)
	30-40	8 (17.4)
	Above 40	1 (2.2)
State you have lived before coming to Howard Pharmacy Program.	Washington DC	6 (13.0)
	Maryland	15 (32.6)
	Virginia	1 (2.2)
	Other States	16 (34.8)
Education (Highest level attended)	2 Year College	5 (10.9)
	4 Years/BS/BA	2 (4.3)
	MSC/MA or Higher	26 (56.5)
	Other	7 (15.2)
Work experience	Never Worked	20 (43.4)
	Worked in Healthcare Related Jobs	9 (19.6)
	Worked in Pharmacy Related Jobs	9 (19.6)
	Other	4 (8.7)
If worked, for how many years?	< 1 Year	2 (4.3)
	1 - 3 Years	12 (26.1)
	> 3 Years	26 (56.5)

Table 2 presents participants' familiarity with, and experience using herbs that alleviate allergic reactions. The survey assessed pharmacy students' knowledge of five herbal therapies commonly used for allergic conditions such as hay fever. On average, 78.7% of participants answered the knowledge-based questions correctly, indicating a generally high level of awareness. The highest correct response rates were observed for questions related to Butterbur and Quercetin (both at 85.7%), and the combination of herbs like Butterbur and Quercetin (88.6%).

These findings suggest strong familiarity with more widely recognized herbal remedies. However, lower correct response rates were noted for questions on nettle extract (57.6%) and eyebright (62.5%), indicating comparatively limited awareness of these lesser-known

therapies. The variability in standard deviation, particularly in the questions on nettle and eyebright, reflects differing levels of knowledge among participants. Overall, the results highlight a solid foundational understanding of certain herbal treatments for allergies, while also revealing areas where further education may be beneficial.

Table 2: Participants familiarity with Knowledge-based questions.

Variables	Participants with Correct Answer N (%)	Mean + SD
Q1-Butterbur, an herb, works as a leukotriene inhibitor, known to reduce allergic symptoms of Hay fever.	30 (85.7)	1.14 + 0.355
Q2-Quercetin, a natural compound, works as a mast cell stabilizer, is present in foods like onions, broccoli, grapes, and apples, and is believed to alleviate allergic symptoms successfully.	30 (85.7)	1.14 + 0.355
Q3-Nettle extract used in the form of nettle tea or supplement can inhibit inflammation and alleviate allergy symptoms of hay fever etc.	19 (57.6)	1.88 + 1.166
Q4-Eyebright is an herb taken orally and is commonly used for eye health, inflammation of the nasal cavity, and sinuses (rhinosinusitis), and allergies like hay fever.	20 (62.5)	1.84 + 1.194
Q5-Combining different herbs, such as Butterbur and Quercetin, may work well for the prevention of common allergies and also enhance their effectiveness in managing them.	31 (88.6)	1.11 + 0.323
AVERAGE	78.7	

The opinion-based responses (Table 3) revealed mixed attitudes among pharmacy students regarding the use of herbal and natural remedies for allergy management. A strong majority (91.5%) agreed that quercetin, known for its antioxidant activity, may be effective for allergies, reflecting high confidence in this particular herbal compound. However, confidence in the overall safety of herbal remedies compared to over the counter (OTC) allergy medications was relatively low, with only 25.8% expressing agreement and 74.3% expressing disagreement. Similarly, only 22.8% of students believed that combining herbal supplements such as Butterbur and Nettle would provide faster relief from allergy symptoms, while 77.2% disagreed.

The most striking finding was in the students' willingness to recommend herbal supplements: only 5.9% were willing to recommend them, while a significant 94.1% were not. Attitudes toward other natural remedies, such as saline nasal irrigation or aromatherapy, were also cautious, with only 22.9% feeling comfortable using them and 77.1% expressing discomfort.

Overall, while students demonstrated knowledge of certain herbs like quercetin, their attitudes revealed skepticism and a general lack of confidence in the safety, effectiveness, and clinical utility of herbal or natural therapies for allergy relief.

Table 3: Opinion-Based Questions.

Variables	Agree (Strongly Agree + Agree) N (%)	Disagree (Disagree + Strongly Disagree) N (%)	Mean ± SD
Q1 – Quercetin is known for its antioxidant activity, but does it really work for allergies?	32 (91.5%)	3 (8.6%)	3.20 ± 0.584
Q2 – Confidence in the safety of herbal remedies vs. OTC allergy medications	9 (25.8%)	26 (74.3%)	2.89 ± 0.718
Q3 – Belief that combining herbs like Butterbur and Nettle alleviates symptoms faster	8 (22.8%)	27 (77.2%)	3.03 ± 0.857
Q4 – Willingness to recommend herbal supplements for allergy relief	2 (5.9%)	32 (94.1%)	3.24 ± 0.741
Q5 – Comfort using other natural remedies like saline irrigation or aromatherapy	8 (22.9%)	27 (77.1%)	3.06 ± 0.802

The cross-tabulation analysis (Table 4) examined the association between students' demographic background—specifically the state they lived in prior to joining the Pharmacy Program—and their responses to selected knowledge- and opinion-based questions. The cross-tabulation analysis revealed that students' geographic backgrounds significantly influenced both their knowledge and attitudes toward herbal and natural allergy remedies.

Specifically, a significant relationship was found between state of origin and belief in the effectiveness of combining herbal supplements like Butterbur and Nettle ($p = 0.009$), as well as comfort with using alternative therapies such as saline nasal irrigation or aromatherapy ($p < 0.001$). Additionally, knowledge about the combined use of herbs like Butterbur and Quercetin for allergy prevention was also significantly associated with students' state of origin ($p = 0.037$). These findings suggest that prior geographic exposure may shape students' perceptions and understanding of herbal and natural treatment approaches.

Table 4: Demographics and Opinion-Based Questions with Statistical Significance (Cross Tabulation).

Demographics	Opinion-Based Questions	P-Values
State that has lived before coming to Howard Pharmacy Program	Q3-Do you think combining different herb supplements, like Butterbur and Nettle, will alleviate allergy	0.009
	Q5-How comfortable do you feel about using other natural remedies, aside from herbs, that can help manage allergy symptoms, such as saline nasal irrigation or aromatherapy?	< 0.001
	Knowledge-based questions	
	Q5-Combining different herbs, such as Butterbur and Quercetin, may work well for the prevention of common allergies and also enhance their effectiveness in managing them	0.037

DISCUSSION

This study explored first year pharmacy school student's knowledge and perceptions regarding the efficacy of key botanicals: Butterbur, Quercetin, Nettle, Eyebright, and combinations thereof for the management of allergic rhinitis. Although only about 78 percent of participants answered all five knowledge-based questions correctly, their responses and attitudes offer valuable insights into both awareness and misconceptions surrounding the use of herbal medicine in allergic disease management.

The majority of participants correctly identified Butterbur (Petasites hybridus) as a leukotriene inhibitor capable of alleviating hay fever symptoms. This is supported by Shimoda et al. (2006), who demonstrated that Butterbur exerts anti-inflammatory effects by inhibiting leukotriene synthesis, making it beneficial in allergic conditions. Its clinical use has been observed primarily in oil extract or capsule form, with studies suggesting comparable efficacy to conventional antihistamines and a favorable safety profile when properly purified.

Quercetin, as stated earlier in this manuscript, is a polyphenolic flavonoid found in many fruits and vegetables, was correctly associated with antioxidant and antiallergic properties by a majority of participants. It functions as a mast cell stabilizer, inhibiting calcium influx, and suppressing the release of histamine, leukotrienes, and prostaglandins (Mlcek et al., 2016). These mechanisms contribute to its proposed therapeutic utility in allergic rhinitis, asthma, and other inflammatory conditions. Its inclusion in various nutraceutical formulations further supports its role as a complementary agent in allergy treatment.

Stinging nettle (Urtica dioica) has long been recognized in traditional medicine for its anti-inflammatory properties. Participants showed a relatively high level of awareness regarding its benefits in managing seasonal allergic symptoms, particularly hay fever. Historical accounts, such as those referenced by Upton (2003), detail its widespread use across cultures, while modern research confirms its activity in modulating pro-inflammatory pathways (Amiri et al., 2016). Nettle is commonly used in teas, freeze-dried capsules, and tinctures to support respiratory and immune health.

A significant number of participants incorrectly labeled Eyebright (Euphrasia officinalis) as ineffective in managing allergic symptoms. Contrary to this perception, Eyebright has been traditionally used to address inflammation of the eyes, nasal cavity, and sinuses. Pharmacological evidence supports its use in rhinosinusitis and hay fever (Bermejo et al., 2000; Ersoz et al., 2000). The misclassification highlights a gap in public knowledge, possibly due to limited mainstream exposure or ambiguity surrounding its name and intended indications.

Interestingly, the question regarding the use of combined herbal therapies such as Butterbur and Quercetin was commonly answered incorrectly, with participants believing that such combinations are ineffective or potentially unsafe. However, available literature and traditional practices suggest that combining botanicals with complementary mechanisms of action may enhance therapeutic outcomes without significant risk of adverse effects. For example, combining leukotriene inhibitors with mast cell stabilizers could provide broader symptomatic control in allergic rhinitis. The false classification of this statement underscores a need for improved education on herb-herb interactions and evidence-based integration.

Survey results revealed a favorable outlook among respondents regarding the potential of herbal remedies in allergic disease management. Over 85% expressed strong agreement that herbal agents such as Quercetin, Nettle, and Eyebright could improve community health and reduce allergy symptoms with minimal toxicity. This suggests increasing public interest in natural, low-risk alternatives to conventional pharmacotherapy.

This study is not without limitations. Notably, the relatively small sample size may limit the generalizability of the findings. Additionally, the homogeneity of the survey population—such as similarities in demographic characteristics, geographic location, or professional background—may have introduced bias or reduced the applicability of the results to a

broader population. The survey also had limitations, it is not a validated or reliable. These factors should be carefully considered when interpreting the study's conclusions.

CONCLUSION

The findings from this study highlights both the potential and the misconceptions surrounding herbal therapies for allergic rhinitis. While more than three-fourth of participants correctly answered knowledge-based questions, attitudes were overwhelmingly positive—over 70% agreed or strongly agreed that herbal remedies can help manage allergy symptoms. Each herb surveyed received about 85% support, and 88% supported using herbal combinations. Disagreement was minimal, ranging from 0% to 6%.

However, the study is limited by its small, homogenous sample (n=34), reducing generalizability. Future research should involve larger, more diverse populations and explore additional factors—such as cultural beliefs, health literacy, and marketing influences—to better understand the role of herbal remedies in allergy care.

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