



DARK CIRCLES AND PUFFY EYES – THE USE OF CUCUMBER SLICES, CHAMOMILE TEA BAGS, WITCH HAZEL, ARNICA, AND STUDENTS SURVEY

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ABSTRACT

Dark circles and puffy eyes affect people of all ages due to factors like lifestyle choices, aging, medical conditions, and genetics. This study examines four herbal remedies—cucumber, chamomile tea bags, witch hazel, and arnica for treating these concerns and evaluates first-year pharmacy students' knowledge and opinions on these remedies. Despite the prevalence of products containing these ingredients, scientific literature supporting their efficacy, particularly for chamomile tea bags and arnica, is scarce. A survey with 5 knowledge-based and 5 opinion-based questions was conducted among 36 participants. Results showed a 75.4% correct answer rate for knowledge-based questions, with most participants (97.1%) acknowledging the variability in effectiveness and the importance of consulting healthcare professionals. However, opinion-based questions revealed a negative attitude towards herbal remedies, with over 77.1% disagreeing with their potential benefits, especially for cucumber and chamomile tea bags. Lower but still significant disagreement was observed for arnica (71.4%) and witch hazel (63.6%). These findings underscore the importance of educating participants about remedies for dark circles and puffy eyes, particularly for less understood remedies like witch hazel. Overall, participants were skeptical about natural remedies for dark circles, aligning with the need for evidence-based treatments in this area (as highlighted in the literature). Future research should prioritize proven treatments, while pharmacy curricula should adapt to the growing use of natural herbs, empowering pharmacists to guide patients responsibly.

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Introduction

Dark circles, scientifically termed periorbital hyperpigmentation, refer to the darkening of the skin beneath the eye area. Puffy eyes, also known as periorbital edema, occur when the skin surrounding the eyes becomes swollen or inflamed, resulting in a visibly swollen or "puffy" appearance [1].

Multiple factors contribute to the development of dark circles. Hyperpigmentation may arise from excessive sun exposure, hormonal fluctuations, or, in certain cases, overproduction of melanin due to genetic factors. Thin skin in the under-eye area also facilitates the visibility of blood vessels. Additionally, factors such as insufficient sleep, allergies, inflammation, or fatigue can lead to vasodilation, exacerbating the darkness [2].

Fluid retention is a primary contributor to puffy eyes. Dehydration, excessive salt intake, hormonal changes, allergies, or specific medical conditions can cause fluid accumulation under the eyes. With advancing age, the supportive structures of the skin and muscles weaken, resulting in sagging and puffiness [3].

Dark circles and puffy eyes are prevalent dermatological concerns, accounting for a significant proportion of patients seen in dermatology clinics. While typically benign, they can profoundly impact an individual's quality of life, affecting self-esteem and leading to emotional distress. Severe puffiness may even impair vision or cause discomfort [4].

The prevalence of dark circles and puffy eyes increases with age but can affect individuals of any age group. It is common in both genders and across all ethnicities, with varying degrees of severity. However, despite the association with aging, an Indian study showed that the majority of patients affected are females in the age group of 16–25 years (95 out of 200). Among the 200 patients studied, it was more prevalent in women (162 [81%]) than men and the majority of the affected women were housewives (91 [45.50%]) [5].

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Currently, various treatments are available for dark circles and puffy eyes. Topical treatments, such as eye creams containing ingredients like retinol, vitamin C, peptides, and caffeine, have been shown to improve skin texture, reduce pigmentation, and minimize puffiness [6]. Cosmetic procedures, including chemical peels, laser therapy, microneedling, and dermal fillers, can address hyperpigmentation, tighten skin, and reduce puffiness [7]. Home remedies, such as cold compresses, cucumber slices, tea bags, and adequate sleep, can offer temporary relief. Lifestyle modifications, such as proper hydration, a balanced diet, sufficient sleep, sun protection, and stress management, are also beneficial for improving skin health and reducing dark circles and puffiness [8]. The following is a review of some common herbs used in formulations for the treatment of dark circles and puffy eyes, which are also the subject of this survey.

Cucumber Slices

Cucumber slices are commonly incorporated into skincare regimens and home remedies because of their hydrating and cooling attributes. Applying cucumber slices to the eyes may provide temporary relief by alleviating puffiness and imparting a soothing effect. The abundant water content and gentle astringent qualities of cucumbers and the cold temperature can induce vasoconstriction, potentially diminishing the visibility of dark circles by reducing the dilation of blood vessels [9, 10]. The activity that cucumber exhibits in suppressing tyrosinase and melanin production is attributed to its primary bioactive components cucurbitacin D and 23, 24-dihydro cucurbitacin D [11].

In early 2011, Akhtar *et al.* examined the effects of a topical water-in-oil (w/o) emulsion containing 3 percent cucumber extracts compared to a control (without cucumber) in 21 healthy volunteers over four weeks. While the cucumber formulation led to significant reductions in sebum levels, changes in melanin content were not statistically significant. Transepidermal water loss and erythema increased with the test formulation, but these changes were not statistically significant. Despite nonsignificant differences in melanin content between the base and formulation over four weeks, the formulation gradually reduced melanin content over the final three weeks after an initial mild increase. The authors suggested that cucumber extracts may have potential in skincare products for medical and cosmetic purposes, particularly for skin whitening, but further research is needed [12].

Chamomile Tea Bags

Chamomile contains flavonoids, which are compounds known for their ability to calm the skin surrounding the eyes. Additionally, chamomile's anti-inflammatory properties can alleviate discomfort and soothe dry or irritated eyes. Placing chilled chamomile tea bags on the eyes may provide temporary relief by reducing puffiness and offering a calming sensation. This effect is attributed to chamomile's anti-inflammatory and antioxidant properties, which can help reduce swelling and irritation [13].

Witch Hazel

Witch hazel contains chemicals called tannins. When applied directly to the skin, its astringent properties can help tighten the skin, potentially reducing the appearance of puffiness. Additionally, its anti-inflammatory effects may help soothe irritation and reduce swelling [14]. Although there are limited clinical studies on the use of witch hazel for dark eyes, there is clinical supporting literature that proves it's an inflammatory action of skin damage including the skin around the eyes from UVB erythema [15].

Arnica

Arnica is a well-known homeopathic herb utilized for centuries due to its analgesic and anti-inflammatory properties, particularly in treating pain and bruises. Topical application of arnica can expedite wound healing, alleviate insect bites, and manage dandruff [16]. There are many dark circles and puffy eye treatment products on the market that contain arnica as one of the ingredients, addressing the efficacy in the enhancement of local blood circulation leading to reduced swelling.

There were a few clinical studies of these four herbs on dark circles and puffy eyes. Especially no direct scientific evidence supporting the effectiveness of chamomile tea bags and arnica in treating dark circles and puffy eyes. The objective of this study is to conduct a literature review on the efficacy and properties of four herbal products. Furthermore, there was a notable lack of research specifically investigating the knowledge and opinions of healthcare professionals regarding the use of herbal remedies for dark circles and puffy eyes. To address this gap, our study aimed to explore the understanding and perspectives of pharmacy students concerning the use of herbal treatments for these conditions.

Materials and Methods

This survey was conducted as part of the Drug Information course, a mandatory 2-credit-hour class for first-year professional pharmacy students. In this course, students received instruction on research methodology and survey administration. Each student was assigned an individual topic and tasked with crafting an introduction and developing two sets of survey questions. Demographic data on gender, age, residence, and work experience before joining the Howard University School of Pharmacy and work experience were collected. In the questionnaire, knowledge-based statements were framed to elicit a true or false answer. The first set comprised 5 knowledge-based questions, while the second set contained 5 opinion-based questions. A 2-point Likert Scale (1=strongly agree or agree; 2=disagree or strongly disagree) was used to score responses for opinion-based statements. The closer to 1 the scores were, the more responses were deemed in agreement. All questions were incorporated into an online survey, and students were invited to participate in answering them. A descriptive and chi-square statistical

analysis was conducted using the latest version of SPSS. The findings were distributed to the students.

Results and Discussion

The demographic breakdown from **Table 1** reveals that the participants in the study are predominantly female, constituting 75%. Over ninety percent (90%) of the sample, falls within the 18-30 age range, indicating a predominantly young demographic. Regarding the state of residence before joining the Pharmacy Program, over half of participants, (56.4%), previously resided in the DMV area (DC, MD, and VA).

Table 1. Demographics Data (Age, Gender, and Residence)

Demographic Characteristic	Breakdown of demographic characteristics	n (%)
Gender	Male	10 (25%)
	Female	30 (75%)
Age (years)	18-30	36 (90%)
	Above 30	4 (10%)
State you have lived before coming to Howard Pharmacy Program.	DMV (DC, MD, and VA)	22 (56.4%)
	Other States	17 (43.6%)

The data presented in **Table 2** provides insights into the work experience and educational backgrounds of the participants. The majority of participants, (65%), had over 2 years of paying job experience before enrolling in the program. A slight majority of participants (52.6%), reported having no prior healthcare-related employment. In contrast, 47.4% of participants had either pharmacy-related or health-related work experience. In terms of educational attainment, the vast majority of participants (82.5%) possessed a Bachelor of Science (BSc) degree or higher before joining the pharmacy program.

Table 2. Demographics (work experience and education) Data

Survey Question	Answers	n (%)
How many years have you had a paying job before joining the Pharmacy program at Howard?	0-2 years	14 (35%)
	Above 2 years	26 (65%)
What kind of work have you had?	None or Non-Healthcare	20 (52.6%)
	Pharmacy - related, or Non-Pharmacy but Other healthcare-related	18 (47.4%)
What is the highest educational level you have achieved before joining the pharmacy program at Howard?	Pre-pharmacy or Associate	7 (17.5%)
	BSc or higher	33 (82.5%)

The data from the knowledge-based questions regarding remedies for dark circles and puffy eyes (**Table 3**) indicates varying levels of understanding among participants. For the question about cucumber slices, 82.9% of participants correctly identified that they could constrict blood vessels in the under-eye area, aligning well with the literature findings supporting this effect. Similarly, over eighty percent (83.3%) correctly recognized the antioxidant properties of chamomile tea bags in reducing puffy eyes and dark circles, consistent with literature suggesting their potential benefits. However, only 36.1% of participants knew that witch hazel is not typically recommended for dark circles due to its astringent properties, which contrasts with literature indicating its limited efficacy in addressing this concern.

Over three-fourths (77.8%) of participants recognized that while some herbal remedies may offer temporary relief, they are not universally endorsed by the survey participants as comprehensive treatments, which is supported by literature emphasizing the multifactorial nature of dark circles.

Additionally, almost all (97.1%) acknowledged the variability in effectiveness among individuals and the importance of consulting healthcare professionals for personalized advice, echoing literature recommendations.

Overall, the average correct answer rate across all questions was 75.4%, suggesting a moderate level of understanding among participants regarding herbal remedies for dark circles, with room for improvement in certain areas.

Table 3. Results for the Knowledge-based Questions

Question	Correct Answer	Participants with Correct Answers (n%)	True (n)	False (n)	Mean Correct Answers Ratio	SD	Variance
1 Cucumber slices are effective in reducing dark circles because they constrict blood vessels in the under-eye area.	True	29 (82.9%)	29	6	0.829	0.382	0.146
2 Chamomile tea bags may help reduce puffy eyes and dark circles due to their antioxidant properties.	True	30 (83.3%)	30	6	0.833	0.378	0.143
3 Witch hazel is not typically recommended	False	13 (36.1%)	23	13	0.361	0.487	0.237

	for dark circles under the eyes because it is more commonly used as an astringent and may not have significant hydrating properties.							
4	While some of these remedies may offer temporary relief for specific symptoms (e.g., puffiness), healthcare professionals do not unanimously support their use as highly effective or comprehensive treatments for dark circles under the eyes.	True	28 (77.8%)	28	8	0.778	0.422	0.178
5	The effectiveness can vary from person to person, and there are often multiple factors contributing to dark circles, such as genetics, allergies, and lifestyle. It's advisable to consult a healthcare professional for personalized advice and potential treatments.	True	34 (97.1%)	34	1	0.971	0.169	0.029
Average			75.4%			0.754	0.368	0.147

The data from the following table (**Table 4**) revealed that there is a notable discrepancy between participants' beliefs about the effectiveness of certain remedies for dark circles and the facts reported in the literature.

For instance, regarding cucumber slices, chamomile tea bags, and arnica, the majority of respondents (over 70%) disagreed or strongly disagreed with their efficacy in reducing dark circles or puffiness, aligning more closely with the literature findings, which suggests limited evidence supporting their effectiveness.

Similarly, respondents expressed skepticism about the practicality and benefits of witch hazel, with over 60% disagreeing with its use for dark circles, consistent with literature suggesting its astringent properties may not be well-suited for this purpose. Moreover, when asked about the combination of these remedies, the majority of respondents again disagreed with the notion that combining them yields better results, indicating a discrepancy between popular beliefs and scientific evidence.

Overall, the average Likert score across all statements was 1.73, suggesting a prevailing skepticism among participants regarding the efficacy of natural remedies for dark circles, which is consistent with the literature's emphasis on the need for evidence-based treatments in this area.

Table 4. Results for the Opinion-based Questions

		N (%)		Mean Likert Score (1-2)	SD	Total Respondents (n)
Statements		Agree or Strongly Agree	Disagree or Strongly Disagree			
1	In your opinion, how effective do you believe cucumber slices are in reducing the appearance of dark circles under the eyes, and why?	8 (22.9%)	27 (77.1%)	1.77	0.426	35
2	Do you think chamomile tea bags are a practical and soothing remedy for addressing puffy eyes and dark circles? Why or why not?	8 (22.9%)	27 (77.1%)	1.77	0.426	35
3	What is your professional opinion on the use of witch hazel as a natural treatment for dark circles under the eyes, and what are its potential benefits or drawbacks?	12 (36.4%)	21 (63.6%)	1.64	0.489	33
4	Based on your experience, how would you rate the effectiveness of arnica in alleviating dark circles and puffiness under the eyes, and what do you consider to be its most significant advantages?	10 (28.6%)	25 (71.4%)	1.71	0.458	35
5	In your professional opinion, do you believe that combining these natural remedies, such as cucumber slices, chamomile tea bags, witch hazel, and arnica, yields better results for individuals with dark circles under the eyes? Why or why not?	8 (22.9%)	27 (77.1%)	1.77	0.426	35
Average				1.73		

The data presented in **Table 5** demonstrates a statistically significant association between participants' perspectives regarding the utilization of witch hazel for treating dark circles and puffy eyes and their professional experience. While the majority of participants disagreed on the efficacy of witch hazel (64.5%), those with a healthcare background expressed higher levels of disagreement. (81.3%, $P=0.044$). For those with no healthcare background, there was a similar prevalence of agreement (53.3%) and disagreement (46.7%) regarding the effectiveness of witch hazel.

Table 5. Work Experience vs Opinion-based Question 3

Survey Question: What is your professional opinion on the use of witch hazel as a natural treatment for dark circles under the eyes, and what are its potential benefits or drawbacks?

Demographics		Agree or Strongly Agree, n (%)	Disagree or Strongly disagree, n (%)	p-Values
Total		11 (35.5%)	20 (64.5%)	
Work	None or non-healthcare	8 (53.3%)	7 (46.7%)	
	Pharmacy-related or non-pharmacy but other healthcare	3 (18.8%)	13 (81.3%)	0.044

The study, in conjunction with a literature review, shed light on the participants' knowledge and opinions regarding herbal remedies for dark circles and puffiness. The literature search revealed some scientific support for the effectiveness of cucumber slices and witch hazel in reducing these concerns. However, limited evidence was found for the efficacy of chamomile tea bags and arnica in addressing dark circles and puffiness. Despite the popularity of these remedies, there is a lack of comprehensive research supporting their effectiveness. This aligns with participants' skepticism towards certain herbal remedies, emphasizing the importance of evidence-based treatments and consultation with healthcare professionals.

The study revealed that the participants were predominantly young, female, and from the DMV area, with prior work experience and healthcare-related backgrounds. While they demonstrated a strong understanding of certain herbal remedies like cucumber slices and chamomile tea bags for reducing dark circles and puffiness, there were gaps in knowledge regarding other remedies such as witch hazel. Participants expressed skepticism towards the efficacy of herbal remedies, highlighting a disconnect between popular beliefs and scientific evidence. This emphasizes the importance of relying on evidence-based treatments and consulting healthcare professionals for personalized advice. The study's limitations, including its small sample size and potential biases, suggest a need for larger, more diverse studies in the future to enhance research quality and scope. Overall, the findings underscore the importance of further education and dissemination of accurate information to ensure informed decision-making and optimal outcomes in addressing under-eye concerns.

The primary goal of this study is to conduct a literature review of the herbs in the use of puffy eyes. The secondary goal was to investigate the knowledge and opinions of pharmacy students regarding the utilization of herbal remedies for treating dark circles and puffy eyes.

Cucumber slices are valued in skincare for their hydrating and cooling properties, offering temporary relief from puffiness and soothing the eye area. Their high-water content and mild astringent qualities may constrict blood vessels, potentially diminishing dark circles by reducing blood vessel dilation. In addition, cucurbitacin D and 23, 24-dihydro cucurbitacin D in cucumbers are thought to inhibit tyrosinase activity and melanin production.

There were some scientific findings of the effectiveness of cucumber and witch hazel on dark circles and puffy eyes [8, 11, 12, 15]. However, even though there are many products on the market, there is a lack of scientific research on the effectiveness of chamomile tea bags and arnica. Thus, while they may provide short-term benefits, they are unlikely to offer a long-term solution. Additionally, some individuals may experience sensitivity or allergic reactions to specific herbal remedies. Therefore, it is essential to conduct a patch test and consult with a healthcare professional before using them on the delicate skin around the eyes. It is advisable to consider their use as part of a broader skincare routine rather than relying solely on them for treatment.

When it comes to the survey data, a total of 40 students participated and answered the demographic questionnaire. While the survey had a high response rate of around 90%, there was a predominantly female and young demographic among the respondents. Additionally, a significant portion of participants had prior work experience and possessed advanced educational qualifications. These findings indicate a diverse and well-educated participant cohort, shedding light on the characteristics of the surveyed population.

The survey data reveals a strong understanding among participants regarding various herbs' benefits for reducing dark circles. Cucumber slices, known for their cooling and hydrating properties, were acknowledged by 82.9% of respondents. Similarly, 83.3% recognized chamomile's anti-inflammatory effects. Arnica, though primarily used for bruising, was acknowledged by 71.4% for its potential to diminish dark circles. However, only 36.4% agreed on witch hazel's function, despite its astringent properties that can tighten and tone the skin. While healthcare professionals don't unanimously endorse herbal treatments for dark circles, most participants (97.1%) acknowledged the variable effectiveness of these remedies and the importance of consulting professionals for personalized advice.

While the majority of the participants were able to answer the knowledge-based questions correctly, the survey data on opinion-based questions reveals that they exhibited a strongly unfavorable stance toward herbal remedies for treating dark circles and puffy eyes, with nearly 77.1% strongly disagreeing or disagreeing with cucumber, chamomile tea bags, and the combination of herb products. Similar to arnica, 71.4% of the participants disagree with its benefits. Witch Hazel owned the lowest disagreement percentage, around 63.6%, but it was still relatively high compared to the agreement percentage range from 22.9%-36.4%, especially about 64.5% of those disagreements are with healthcare working backgrounds.

The data from the knowledge-based questions underscores the importance of education and awareness regarding remedies for dark circles and puffy eyes among participants. While there is generally a good understanding of some remedies, such as cucumber slices and chamomile tea bags, there are gaps in knowledge regarding others, like witch hazel. This highlights the

need for further education and dissemination of accurate information, particularly among healthcare professionals and individuals seeking solutions for under-eye concerns. Moreover, the recognition of the multifactorial nature of dark circles and the importance of personalized advice from healthcare professionals indicates a growing awareness of the complexities involved in addressing this issue. Overall, the data suggests a moderate level of understanding among participants but emphasizes the ongoing need for education and guidance in this area to ensure informed decision-making and optimal outcomes.

The data from the opinion-based questions revealed that there exists a significant disparity between participants' beliefs about the effectiveness of natural remedies for dark circles and the scientific evidence reported in the literature. Despite popular beliefs, the majority of respondents expressed skepticism about the efficacy of remedies such as cucumber slices, chamomile tea bags, witch hazel, and arnica in reducing dark circles or puffiness. This underscores the importance of relying on evidence-based treatments and consulting healthcare professionals for personalized advice rather than relying solely on popular beliefs or anecdotal evidence.

The limitation of this study may arise from its relatively small sample size, as well as potential cultural biases and a deficiency in demographic diversity among participants. Future investigations possess the capacity to enhance the quality of our research and broaden its scope by exploring additional facets.

Conclusion

Dark circles and puffy eyes, which significantly impact quality of life, stem from various factors. Despite numerous treatments available, there's a notable lack of clinical research to back their efficacy. Short-term benefits have been observed with cucumber, witch hazel, and potentially chamomile tea bags, drawing parallels from studies on green tea bags. No research exists on arnica, highlighting the need for further study despite its common inclusion in products. Most treatments, including these herbs, offer only temporary relief, underlining the importance of investigating their long-term effectiveness. Additionally, the risk of sensitivity or allergic reactions to herbal remedies necessitates a patch test and consultation with a healthcare professional before application around the sensitive eye area. For the best results, combining herbal or other treatments with lifestyle changes, a skincare routine, and professional advice from dermatologists or ophthalmologists is recommended to tailor the most suitable treatment plan.

Based on the survey results, while most participants provided correct answers to five knowledge-based questions on herbal products for dark circles and puffy eyes, they exhibited a strongly unfavorable stance toward herbal remedies for treating these concerns. This highlights a significant disparity between participants' beliefs and scientific evidence regarding the effectiveness of natural remedies. Thus, it emphasizes the importance of future investigation into evidence-based treatments and the ongoing education of healthcare students on natural herb products.

The study's limitations include a small sample size, consisting solely of pharmacy students from one college. Consequently, the ability to generalize survey findings to other institutions is hindered. Hence, there is a need for larger studies spanning multiple universities and encompassing all healthcare professions.

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