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LEVERAGING DIRECT-TO-CONSUMER ADVERTISING: IMPACT ON PUBLIC AWARENESS AND PURCHASE INTENTIONS OF LICORICE AND ALOE VERA SUPPLEMENTS FOR MANAGING GASTRO-ESOPHAGEAL REFLUX DISEASE AMONG WOMEN

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Abstract

This study investigates the role of Direct-to-Consumer Advertising (DTCA) in promoting licorice and aloe vera-based dietary supplements as safer remedies for managing GERD symptoms among women in Pakistan. Using a quasi-experimental pretest-posttest design, 200 participants from Karachi and Hyderabad completed Likert-scale questionnaires assessing their knowledge and purchase intentions before and after exposure to a DTCA video. The Wilcoxon Signed-Rank Test, Mann-Whitney U Test, and Pearson Correlation were applied for analysis. Results indicate a significant increase in participants' knowledge and purchase intentions following DTCA exposure, with higher education levels linked to more excellent knowledge retention. A strong positive correlation between post-knowledge and purchase intention highlights the effectiveness of DTCA in influencing consumer behavior. The study recommends evidence-based advertising campaigns and consumer education initiatives to ensure informed decision-making. Future research should explore long-term behavioral changes and cross-media comparisons to optimize DTCA strategies and support responsible marketing practices in the health sector.

INTRODUCTION

Gastroesophageal reflux disease (GERD) is a chronic digestive condition that affects a large number of people worldwide, including in developing nations like Pakistan, where poor dietary practices and Western dietary influences, in combination with stress, predispose populations to it. It is characterized by several symptoms, prominent among them being heartburn, regurgitation, and vomiting. These are the kinds of things that make one think that the digestive tract is not functioning correctly, particularly at its exit. (Fass, 2022; 2021; Zhang et al., 2021).

In Pakistan, it is estimated that 25-30% of the population suffers from GERD, but the actual prevalence may be much higher due to underreporting (Gu et al., 2021). Many individuals misinterpret GERD symptoms as general indigestion, leading to delayed or inadequate treatment (Krupavaram et al., 2023). This misinterpretation is not unique to Pakistan; studies suggest that such symptom misattribution is common in the prediagnostic phase of GERD (Gu et al., 2021). Consequently, individuals often fail to recognize the underlying pathological condition (Krupavaram et al., 2023).

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A growing number of people rely on over-the-counter (OTC) proton pump inhibitors (PPIs) for symptom relief (Martin et al., 2022). However, there is a limited understanding of how consumers perceive natural dietary supplements as alternative treatments (Gu et al., 2021). Licorice and aloe vera are considered relatively safe, and emerging evidence suggests that formulations containing both may alleviate GERD symptoms (Krupavaram et al., 2023; Martin et al., 2022). Despite this, OTC PPI users often remain unaware of these potential alternatives (Meyer et al., 2022). One factor contributing to this lack of awareness is the limited presence of natural supplements in direct-to-consumer advertising (DTCA) (Meyer et al., 2022).

DTCA has become a prominent marketing strategy in the pharmaceutical industry, significantly influencing consumer behavior and decision-making (Gu et al., 2021). While extensive research has been conducted on the impact of DTCA in promoting pharmaceutical drugs, little is known about its potential to raise awareness of natural dietary supplements for managing GERD (Tabibian, 2023). Most existing studies prioritize clinical efficacy or evaluate the general effects of DTCA without addressing its role in promoting natural alternatives (Tabibian, 2023).

This research gap is significant because DTCA has the potential to act as an educational tool (Meyer et al., 2022). Beyond encouraging product sales, it can be used to inform consumers about the risks and benefits of dietary supplements (Gu et al., 2021). Leveraging DTCA for public health advocacy could bridge the awareness gap, helping consumers make informed decisions about GERD management through safer, natural options (Meyer et al., 2022; Tabibian, 2023). Avoiding the risks of superstar prescription medications as much as possible, might it instead make better use of its creative power to promote the kinds of healthier, earth-friendly solutions to chronic health problems that we were mad to even consider alternatives in the first place?

Aim

This study aims to investigate the role of Direct-to-Consumer Advertising (DTCA) in promoting **dietary supplements** formulated using Licorice or Aloe Vera as core ingredients as safer and more effective remedies among women experiencing gastrointestinal issues in Pakistan.

Objectives

1. To assess the public's initial knowledge and awareness of licorice and aloe vera-based dietary supplements before exposure to DTCA.
2. To evaluate changes in public knowledge and awareness after viewing a DTCA video promoting these supplements.
3. To examine how increased public knowledge influences purchasing intentions for licorice and aloe vera-based supplements.
4. To analyze whether knowledge and perceptions of these dietary supplements differ across education levels.

Literature Review

Gastroesophageal reflux disease (GERD) isn't something people experience only once in a while. It's a chronic condition where stomach acid or bile irritates the esophagus. GERD's painful symptoms, which can include regurgitation, chest pain, and difficulty swallowing, occur when the lower esophageal sphincter isn't doing its job (Fass, 2022; Fass et al., 2021). Commonly and easily treated in the Western world with a combination of lifestyle adjustments, over-the-counter medications, and prescription-strength medicines (Bridgeman & Dalal, 2022; Meyer et al., 2022), GERD's presence in Pakistan is not well understood. Many people risk serious complications by not treating the condition (Jabbar et al., 2024; Rasool et al., 2021). However, studies and researchers have begun to shine a light on the issue. As they have, they've uncovered the significant role that lifestyle risk factors, poor dietary choices, and a lack of healthcare access play in the prevalence of GERD in Pakistan (Latif et al., 2023; Zhang et al., 2021).

Although widely utilized to alleviate symptoms of excessive stomach acid, common misconceptions exist regarding the long-term safety of over-the-counter PPIs (Bridgeman & Dalal, 2022; Meyer et al., 2022). Many people are simply unaware of the serious side effects linked with their chronic use. These include some rather concerning deficiencies of key nutrients that have a direct bearing on human health—PPIs are known to reduce the absorption of

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magnesium and calcium, for example (Schulz et al., 2022). Of even greater concern is the now widely acknowledged increased risk of serious kidney diseases, including acute interstitial nephritis and chronic kidney disease (Meyer et al., 2022). And then there's bone health, with a now direct and serious association between using PPIs regularly and an increased risk of significant bone fractures (Meyer et al., 2022).

In recent years, considerable interest has been devoted to dietary supplements by chronic disease patients. This is especially true for conditions like GERD (Martin et al., 2022; Tursi et al., 2024). Pharmaceuticals tend to be viewed as heavy artillery, with risks and side effects that make many people wary. Supplements, particularly those whose ingredients are natural, are commonly viewed as safer, more benign, and even more preventive than pharmaceuticals (Ali et al., 2024). Licorice (Glycyrrhiza glabra) has a long history (thousands of years) of use that stretches across many cultures. It is well-known as a soothing, anti-inflammatory ingredient, particularly in conditions affecting the upper gastrointestinal tract (Martin et al., 2022).

The rising interest in natural therapies has resulted in a profusion of dietary supplement brands in the marketplace. Leading names like Nutrifactor, Nature's Bounty, and Herbiotics offer a range of supplement products that supposedly improve digestive health (Ali et al., 2024). Nutrifactor, for example, offers formulations that combine licorice and aloe vera to target GERD and other gastrointestinal problems. These brands command consumer trust because their products align with the upsurge in wellness that is largely moving in a natural direction (Khan et al., 2024).

The GERD efficacy of licorice and aloe vera is well documented. Licorice, especially deglycyrrhizinated licorice (DGL), has been shown to provide relief from GERD symptoms by reducing inflammation and soothing the esophageal lining (Krupavaram et al., 2023; Martin et al., 2022). DGL does not contain the amount of glycyrrhizin that whole licorice does; high amounts of glycyrrhizin can lead to problems like high blood pressure (Krupavaram et al., 2023). Aloe vera is known for a different mechanism of action: in the esophagus, aloe vera reduces acid production and promotes healing (Uthansingh et al., 2024). When these two ingredients are combined into a single formulation, they work together to soothe and heal the esophagus (Uthansingh et al., 2024). This combination may also be safer and more natural than over-the-counter proton pump inhibitors (PPIs).

The Health Belief Model (HBM) provides a way to understand health-related behaviors at the level of the individual—that is, why some people do and some people do not take preventive actions to safeguard their health. The HBM is based on the postulation that people's health behavior is affected by their perceptions of three things:

1. the susceptibility
2. the severity
3. the perceived benefits (Ahmed et al., 2023; Eitze et al., 2021)

Advertising that goes directly to the consumer plays an essential role in creating the populace's understanding of health matters (Md Saman et al., 2021; Paygah & Colabi, 2023). It concerns itself precisely with those individuals being targeted and allows for the sidestepping, in this instance, of the more traditional healthcare intermediaries we have in place (Rollins et al., 2021). We have some critics suggesting that this might lead to undue influence and even some pathological behaviors regarding our decision-making processes (Gu et al., 2021; Rollins et al., 2021). At the same time, we do have some individuals saying that this can be a very effective method for informing us about just what kinds of treatments are out there (Gu et al., 2021). Somehow, amid all of the controversy we have surrounding the more traditional forms of advertising, what with the claims of it being misleading or simply too persuasive, we have the supplement industry in the United States spending roughly $9 billion annually on advertising (Paygah & Colabi, 2023).

These insights have led to the formulation of the following three hypotheses in this research:

H1: Exposure to Direct-to-Consumer Advertising (DTCA) will lead to a significant improvement in public knowledge of **licorice and aloe vera-based dietary supplements**.

H2: Increased public knowledge of **licorice and aloe vera-based dietary supplements** will positively influence the intention to purchase them.

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H3: Knowledge and perceptions of **licorice and aloe vera-based dietary supplements** will vary across education levels.

Methodology:

We collected quantifiable data and verified or refuted our hypotheses. We discerned patterns in public knowledge and perceptions. We collected data to test the hypotheses using a philosophy of pretty much the same design, but without a controlled video to watch, that other researchers have used to study the influence of DTCA on public knowledge and behavior. Our data indicated that participants in the study were more knowledgeable about the dietary supplement marketplace and more critical of dietary supplement advertising after they viewed the mock dietary supplement video compared to the way they performed on those same measures before they viewed the video.

Our study focused on the woman populations of Karachi and Hyderabad, aged 18 years and older. We recruited our participants from several hospitals in the two cities and concentrated on women who either were currently experiencing or had previously experienced GERD. The study was not only direct in its approach but also had a solid ethical framework because it required all participants to provide written consent before completing the questionnaire.

The data collection process consisted of 200 subjects. It commenced with a pretest administered to all 200 subjects to assess their knowledge about dietary supplements and intentions to purchase them. The pretest was a type of questionnaire, which employed a five-point Likert scale to evaluate the above-mentioned variables. Five individuals collected the data: each individual had a chunk of 50 subjects from which to coax data. After the pretest experience and the pretest completion, all 200 subjects were treated to a video package. The video package itself was quite informative and contained an 11-minute animated video stressing the benefits of licorice and aloe vera in alleviating GERD symptoms. It also served up some info about the actual supplements and brands available.

When the video was finished, every participant filled out a repeated measure questionnaire that was used to gauge whether their knowledge and purchase intentions had changed since they were exposed to the DTCA video. The data that are now being reported were collected after both the video and the measure had been seen by the participant. This measure was developed with the help of some previous studies (see AlShammari et al., 2020; Almuzaini et al., 2023 for details).

The demographic data were summarized using descriptive statistics, which made an overview of the participants' characteristics easy to understand. The knowledge gained from the intervention was assessed using the Wilcoxon Signed-Rank Test, a non-parametric test best used on pre- and post-test pairs when the data don't meet the assumptions of parametric tests. This test was used to determine if the kind of knowledge gained from the intervention impacted participants significantly. Next, we looked at the relationship between the kind of knowledge gained and intended purchasing behavior using Pearson's correlation. Finally, we looked at differences in DTCA knowledge gained across groups when we compared participants at different education levels. To do this, we used the Mann-Whitney U Test.

Data Analysis

Scale Reliability

We performed a reliability analysis using Cronbach's Alpha to see how consistently the 16-item questionnaire had been answered. The 16-item questionnaire propounded the same essential question in various ways to see if the participants would answer it consistently, thus allowing us to assess the effectiveness of the pre and post-intervention data collection.

Table 1 Case Summary

		N	%
Cases	Valid	200	100.0
	Excluded	0	.0
	Total	200	100.0

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		N	%
Cases	Valid	200	100.0
	Excluded	0	.0
	Total	200	100.0

a. Listwise deletion based on all variables in the procedure.

Table 1 shows that all 200 participants were included in the analysis with no missing data, ensuring comprehensive and reliable results for the study.

Table 2 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.937	.936	16

Table 2 gives the reliability statistics for the 16-item questionnaire, which has a Cronbach's Alpha of 0.937. This number indicates excellent internal consistency, suggesting that the items in the questionnaire quite reliably measure the knowledge and purchase intentions of the participants concerning dietary supplements for GERD. The high reliability of this study enhances its overall credibility and validity.

Pre and Post-Knowledge Analysis: Wilcoxon Signed-Rank Test

We applied the Wilcoxon Signed-Rank Test to compare the pretest and posttest knowledge scores of the participants. This non-parametric test was selected because of the non-normal distribution of the data, rendering it appropriate for assessing changes in knowledge levels.

Table 3 Ranks

		N	Mean Rank	Sum of Ranks
Knowledge_post - Knowledge_pre	Negative Ranks	43[a]	56.67	2437.00
	Positive Ranks	98[b]	77.29	7574.00
	Ties	59[c]		
	Total	200		

a. Knowledge_post < Knowledge_pre

b. Knowledge_post > Knowledge_pre

c. Knowledge_post = Knowledge_pre

Table 3 shows the Wilcoxon Signed-Rank Test ranks, contrasting the pretest and posttest knowledge of the participants. With 98 positive ranks, 43 negative ranks, and 59 ties, the test results suggest an increase in knowledge, after viewing the DTCA video, that fulfills the precondition of a signed rank test.

Table 4 Test Statistics

	Knowledge_post - Knowledge_pre
Z	-5.361[a]
Asymp. Sig. (2-tailed)	.000

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a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

The outcomes of the Wilcoxon Signed-Rank Test are shown in Table 4. They assess the impact of the DTCA video on participants' knowledge. A knowledge assessment was given before the video and again afterward. The results show a significant and large effect ($p < .001$) of the intervention. This means the video made a real difference in participants' understanding of what dietary supplements are and how they should be used.

Purchase Intention Pre and Post-Analysis: Friedman Test

The one-way ANOVA has a nonparametric alternative called the Friedman test. This was used to assess differences in participants' intentions to purchase before and after viewing the Direct-to-Consumer Advertising (DTCA) video. This test was appropriate for our objective of determining whether purchase intentions for licorice and aloe vera-based dietary supplements were influenced by Direct-to-Consumer Advertising.

Table 5 Ranks

	Mean Rank
PI_Post	1.72
PI_Pre	1.28

Table 5 shows that the average ranking for purchase intentions during the posttest (1.72) was significantly higher than those during the pretest (1.28). This positive shift suggests that the DTCA video did a good job of persuading participants to consider buying dietary supplements. The move up in the means might be interpreted as reflecting greater product awareness, perceived benefits, and overall consumer confidence.

Table 6 Test Statistics

N	199
Chi-Square	46.436
df	1
Asymp. Sig.	.000

a. Friedman Test

Table 6 displays the results of the Friedman Test. The chi-square value was 46.436, and the p-value was .000, which indicates a statistically significant difference in purchase intentions before and after the DTCA exposure. The participant's perception and their reported willingness to purchase the supplements experienced a significant shift due to the DTCA. This finding provides more evidence of the effectiveness of health-related advertisements and nudges toward the dietary supplement influence pathway.

Assessing Effect of Post Knowledge on Purchase Intention: Correlation Test

We assessed the relationship between participants' post-test knowledge and their purchase intentions with the Pearson Correlation test. We chose this test to determine the strength and direction of the association between the two variables. The application of this test provides insights into how knowledge gained from an intervention influences the consumer decision-making process.

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Table 7 Pearson Correlation

		knowledge_post	PI_Post
knowledge_post	Pearson Correlation	1	.688**
	Sig. (2-tailed)		.000
	N	199	199
PI_Post	Pearson Correlation	.688**	1
	Sig. (2-tailed)	.000	
	N	199	199

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7 shows a very good positive correlation (r = .688, p = .000) between participants' posttest knowledge and their purchase intentions. This tells us that the greater the knowledge about dietary supplements that participants had after seeing the DTCA video, the greater their purchase intentions were. This finding is a real win for the study's objective because it reinforces the notion that our decisions as consumers are better when we have the relevant information to make the decision.

Mann-Whitney U Test

The Mann-Whitney U test was applied to compare post-intervention knowledge across education levels, addressing the objective of evaluating educational influence. It was chosen for its suitability in analyzing non-parametric, independent group comparisons.

Table 8 Ranks

	Education_Level	N	Mean Rank	Sum of Ranks
Knowledge_post	1	131	111.50	14606.00
	2	69	79.62	5494.00
	Total	200		

Table 8 reveals that participants who had elevated levels of formal education showed statistically significant gains in knowledge concerning dietary supplements for GERD. The mean rank of 111.50 associated with this group suggests they had better learning outcomes than those who had a lesser amount of formal education, indicating that the kind of understanding and retention of knowledge they demonstrated was influenced by education.

Table 9 Test Statistics

	Knowledge_post
Mann-Whitney U	3079.000
Wilcoxon W	5494.000
Z	-3.717
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Education_Level

Table 9 shows a big difference in how much knowledge was gained after the intervention, and this difference was based on educational level (p = .000). The Mann-Whitney U test result tells us that

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those with more education tended to have more knowledge after participating in this study. So this is a big hint that educational background influences how much one understands about dietary supplements for managing GERD.

Discussion

This study's findings indicate that participants' understanding of dietary supplements like licorice and aloe vera significantly increased post-exposure to direct-to-consumer advertising. The level of knowledge increases from pre- to post-test affirms the first hypothesis of this investigation. More importantly, this result underscores the effectiveness of dietary supplement direct-to-consumer advertising as a public health communication tool; it is a vehicle for directly transmitting health-related information to consumers.

The research uncovered a correlation that was not merely suggestive of a tendency but was positive and significant. H2 postulated that knowledge would affect purchase intentions because health-promoting products are not typically seen as risky or unsafe. Most participants perceive health-related actions, such as using dietary supplements, as inherently beneficial. They see these actions as reducing the perceived risk in purchasing decisions. Unlike prescription medications, health-promoting products like licorice and aloe vera are often viewed as safer alternatives.

The outcomes of the Mann-Whitney U test reveal significant differences in knowledge across various educational backgrounds. Thus, the third hypothesis (H3) is supported: Individuals with more formal education (n = 96) were more likely to display the benefits of the interventions than individuals with less formal education (n = 80). This finding is consistent with our current understanding of DTCA's differential impact on various demographic groups (Eitze et al., 2021; Khan et al., 2024); i.e., that DTCA messages are more impactful when the target group has the critical thinking skills that come with a higher level of educational attainment. Results were also consistent with the Afzal et al. (2025) study, which contrasted individuals with more formal and less formal education.

These findings spotlight the public health potential of DTCA as a communication vehicle and suggest that it could be used to increase awareness of natural health products in public segments that might benefit from them (Rollins et al., 2021; Zhang et al., 2021). Consumers' perceptions of DTCA's influence are clearly in the positive direction. Most of our studies said they see DTCA positively and even more said they trust the information in DTCA (Bridgeman & Dalal, 2022; Rasool et al., 2021). The issue, though, is about what happens when you take a friendly medium like DTCA and make claims in it that are not reliably evidence-based. Participants in our studies raised concerned eyebrows about this situation. They said health claims in unfriendly-to-judgment mediums like the internet aren't to be trusted, so why make health claims in a friendly medium when the claims aren't reliable? (Tabibian, 2023; Schulz et al., 2022).

Conclusion and Future Directions

This research brings out the prominent role of Direct-to-Consumer Advertising in promoting dietary supplements based on licorice and aloe vera for the management of GERD symptoms among women in Pakistan. DTC advertising is not commonplace in Pakistan, so one of the objectives of the study was to assess what impact, if any, this form of advertising has on target consumers. When advertising directly to consumers, as opposed to physicians, it is crucial to convey appropriate information. DTC advertising is permissible and can be a tool for communicating the relevant information to the segment that the researchers wished to reach.

A managerial perspective of supplement companies can posit that direct-to-consumer advertising can be used to great effect in terms of educating the public about dietary supplements. This is assuming, of course, that the public is actually being educated and not misled in terms of what the science and the evidence say about the efficacy and safety of these products.

Messages must be based on solid evidence and claims must be made with full transparency if not with total honesty. Using health care professionals in the ads can add to the ads' credibility since most people tend to trust the word of a physician more than they trust the voice of a marketing executive. We are also lacking in evidence concerning the efficacy and safety of many dietary supplements; from an ethical

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standpoint, if we are going to use DTCA to educate, we had better do it in an example-without-precedent fashion that walks the evidence-based line.

Lawmakers might want to think about carrying out tighter regulations to make sure that retrospective advertisements—they're not going to impair your manner of speaking—that's the stuff we're buying and selling. Okay, with that said, here comes Elmo. I mean, here comes the educational initiatives empowering us with health literacy so that we can better qualify what counts (and doesn't count) as safe supplements—what with all the informed decisions we're making about the things.

Future research might investigate consumer behavior and product adherence over the long term about DTCA. It could also conduct side-by-side comparisons of different media platforms to find out which advertising channel is most effective. If it does these things, then future research will have done something that the DTCA research of yore cannot claim to have done: it will have taken a step toward developing DTCA strategies that are responsible, effective, and prioritize the well-being of the consumer and the making of informed health choices.

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