



A 12-Years longitudinal Follow-Up Survey on Pharmacy Marketing Effectiveness: Evidence from Iran, 2013–2025

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Highlights

- This 12-year repeated cross-sectional survey evaluated perceived effectiveness of pharmaceutical marketing strategies among Iranian community pharmacies in 2013 and 2025.
- Findings showed significant declines in perceived effectiveness of personal selling, public relations, and traditional advertising, while sales promotion, shelf design, and pharmacy-directed price offers increased.
- The study concludes a shift from material-driven promotion toward relational and knowledge-based approaches is necessary.

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ABSTRACT

Background: Pharmacy marketing strategies play a pivotal role in shaping prescribing and dispensing behavior. Over the past decade, pharmaceutical companies have shifted their promotional approaches in response to regulatory changes, technological advances, and evolving pharmacy practices. However, little is known about how the perceived effectiveness of such strategies has changed over time.

Methods: A repeated cross-sectional survey was conducted in two waves (2013 and 2025). Pharmacies were selected randomly from the national registry, and data were collected using a mixed-methods approach combining structured questionnaires and semi-structured interviews. The questionnaire assessed the effectiveness of marketing strategies on a five-point Likert scale, covering domains such as personal relations, promotional materials, financial incentives, and product presentation. Comparative analysis across years was performed using Welch's t-tests for mean differences, chi-square tests for distributional shifts, and effect size measures (Cohen's d, Cramer's V). False discovery rate (FDR) adjustment was applied to correct for multiple testing.

Results: A total of 488 pharmacies in 2013 and 329 pharmacies in 2025 completed the survey. Descriptive findings indicated an overall decline in the perceived effectiveness of traditional promotional, while interpersonal strategies such as pharmacist–representative relationships and personal skills of representatives showed relative stability. Inferential analysis confirmed significant temporal differences for several strategies, with the strongest effect sizes observed in financial incentives (price reduction offers) and sampling. Thematic analysis of interviews highlighted increasing skepticism toward material-based promotion and a growing emphasis on professional trust and evidence-based information.

Conclusion: This study provides the first 12-year trend analysis of pharmacy perceptions of marketing strategies in Iran. Findings suggest a shift from material-driven promotion toward relational and knowledge-based approaches. These results have implications for both pharmaceutical marketing practice and policy, underscoring the need for adaptive strategies that align with evolving pharmacy expectations.

Keywords: Pharmacy Marketing, Repeated Cross-Sectional Survey, Pharmaceutical Promotion, Trend Analysis, Iran



Introduction

Commercial determinants of health are the conditions, actions and omissions by commercial actors that affect health. They include private sector activities that affect people's health, directly or indirectly, positively or negatively. [1]

Pharmaceutical promotion plays a dual role in shaping healthcare. On the one hand, it can enhance the health of individuals, families, communities, and entire health systems by informing providers about innovative therapies and encouraging the use of effective treatment options. On the other hand, it carries potential risks. Aggressive or poorly regulated promotion may contribute to overtreatment, the use of inappropriate substitutes, or even medication misuse, ultimately undermining patient safety and public trust. [2][3]

On average pharmaceutical companies spend 20% or more of their income on marketing. More recent data suggest that many large pharma firms continue to dedicate about 20–25% of their revenues to combined marketing and sales activities. In some analyses, expenditures for marketing plus related administrative overhead have been as high as 30–35% of sales in certain firms. [4]

The marketing communication mix, rooted in Philip Kotler's concept of the 4 Ps—product, price, place, and promotion—represents the set of tools companies use to influence customer responses. Product decisions address both tangible goods and intangible services, including their features and quality; price involves determining a fair value; place focuses on distribution; and promotion defines how companies communicate with customers. Within promotion, the communication mix typically combines advertising, sales promotion, public relations, personal selling, and direct marketing. Each element serves a specific role: sales promotions drive short-term sales through discounts and offers; PR builds a positive image via sponsorships, press releases, and events; personal selling engages customers directly through representatives; and direct marketing delivers personalized communication through catalogs, calls, and digital channels. [5][6]

Previous studies have shown that pharmaceutical promotion can significantly shape physicians' prescribing behaviors. Evidence from both private and public hospitals indicates that marketing strategies—ranging from gifts and samples to broader elements of the marketing mix—play a measurable role in influencing prescribing decisions. While such practices may support awareness and access to treatment options, they also raise ethical concerns and highlight the need for careful regulation. These insights emphasize that pharmaceutical companies must adopt marketing approaches that are both strategic and ethically responsible, ensuring that their promotional activities enhance prescribing practices without compromising patient care. [7][8]

Research Questions

This study investigates how pharmaceutical marketing strategies have influenced healthcare providers' perceptions and behaviors over time. Guided by a longitudinal perspective covering the 2013–2025 period, the research addresses the following questions:

1. How have different elements of the marketing communication mix—including advertising, personal selling, sales promotion, public relations, and direct marketing—affected healthcare providers' perceptions of pharmaceutical products over the survey period?
2. What changes in the perceived effectiveness of these promotional strategies can be observed between 2013 and 2025?
3. How have regulatory, ethical, and contextual factors shaped the impact of pharmaceutical marketing on prescribing and dispensing behaviors during this period?
4. Which promotional strategies have been most influential in healthcare providers' decision-making processes, and how has their relative influence evolved over time?

These questions aim to capture both temporal shifts and contextual factors in the effectiveness of pharmaceutical marketing, providing insights into evolving practices and perceptions.

Literature Review

Sales promotion

Promotion is a key element of the marketing mix, serving as the primary means by which companies communicate with customers to inform, persuade, and differentiate their products and services. The traditional promotion mix includes advertising, personal selling, sales promotion, public relations, and direct marketing. In recent years, globalization, competition, and digitalization have transformed this landscape, with the internet providing powerful extensions to traditional channels through greater targeting, measurability, and interactivity. Modern promotion strategies therefore require careful integration of both online and offline tools to create coherent campaigns that maximize market impact while maintaining consistency across diverse platforms. [9][10]

Public Relations

Public relations (PR) involves managing external communications to build a positive image of a company and its products. PR activities aim to establish trust, shape favorable attitudes, and enhance customer perceptions, ultimately supporting sales and brand loyalty. Effective publicity helps organizations maintain beneficial relationships with their target audience, creating credibility and a strong market presence. [11][12]

Direct marketing

Direct marketing establishes a direct connection between companies and their customers, bypassing mass media. It uses tools such as email, postal mail, telephone, and the internet to deliver personalized messages and elicit measurable responses. This approach allows businesses to inform existing customers about new products or promotions, strengthen loyalty, and engage potential customers directly. Research shows that direct marketing can enhance the impact of other promotional methods and improve product visibility, although the most effective techniques remain context-dependent. [13][14]

Personal Selling

Personal selling is a key element of the promotional mix, characterized by direct, face-

to-face interaction between a company representative and potential customers. It plays a vital role in building strong customer relationships, enhancing loyalty, and increasing sales productivity by providing tailored information and persuasive communication. While highly effective in generating immediate customer responses, personal selling is resource-intensive, often requiring significant time and cost compared to other promotional methods. Its strength lies in personal engagement, allowing companies to address specific customer needs and foster long-term relationships. [15][16]

Advertising

Advertising is a paid, non-personal communication used to promote products to a broad audience. In the pharmaceutical industry, it targets healthcare professionals and, in some regions, consumers, and is strictly regulated to ensure accuracy and balance. U.S. FDA regulations require advertisements to fairly present benefits and risks, with enforcement actions increasing in recent years (FDA, 2025). In the EU and UK, direct-to-consumer advertising of prescription medicines is prohibited, while healthcare professional-targeted ads must comply with specific standards (ICLG, 2025). These frameworks ensure ethical promotion and informed decision-making. [17][18]

Methodology

Study Design

This investigation employed a repeated cross-sectional design with two survey waves conducted in 2013 and 2025. The study aimed to evaluate changes in the perceived effectiveness of pharmaceutical marketing strategies over a 12-year period from the perspective of pharmacies. By maintaining consistent instruments and procedures across both time points, the design allowed for robust temporal comparisons and identification of long-term trends in marketing practices.

Sampling and Participants

In 2013, the sampling frame consisted of all licensed community pharmacies registered with the Ministry of Health across the country. A simple random sampling approach was applied to this list, ensuring that each pharmacy had an equal probability of selection. This method minimized selection bias and enhanced the

representativeness of the results at the national level. A total of 512 pharmacies were invited to participate, of which 488 provided complete responses.

Although simple random sampling ensured fairness, it did not control for potential imbalances between urban and rural pharmacies or across provinces. To address this limitation, future studies of similar scope would benefit from employing stratified random sampling. Stratification based on geographic region, urban–rural classification, and pharmacy size would provide proportional representation across key subgroups and further strengthen the external validity of findings.

By 2025, a proportion of the pharmacies included in the 2013 sample were no longer active due to closure or relocation. Consequently, a new sample of 338 pharmacy through the primary list, invited again for survey, which finally 329 participated. While this limited the ability to track the exact same units longitudinally, it preserved the representativeness of the survey population at both time points. The overlap between samples allows the study to be interpreted as a trend analysis, or a “cohort-like” repeated cross-sectional study of pharmacies over time.

Data Collection Instruments

Data were collected through a combination of structured questionnaires and semi-structured interviews during both survey periods.

1. Questionnaire:

- The questionnaire was designed to capture standardized quantitative responses on the perceived effectiveness of multiple marketing strategies commonly employed by pharmaceutical companies.
- Each strategy was rated on a five-point Likert scale (very high to very low effectiveness).
- The questionnaire was pilot-tested with a subset of pharmacies to ensure clarity, reliability, and content validity.

2. Semi-Structured Interviews:

- a. In addition to the questionnaire, semi-structured interviews were conducted with pharmacy staff to capture qualitative insights.

- b. The interviews explored contextual factors, personal experiences, and explanations for variations in perceived effectiveness.

- c. Open-ended questions provided the flexibility to probe emerging themes while maintaining comparability across respondents.

The dual use of questionnaires and interviews reflects a mixed-methods approach, which not only improved the reliability of quantitative measures but also enriched the interpretation of findings through qualitative depth. This approach reduced common-method bias and enhanced the credibility of results.

Data Collection Procedure

In both 2013 and 2025, data collection was carried out by trained field researchers who visited pharmacies in person. Each participating pharmacy designated one or more qualified staff members to respond to the questionnaire and interview. Participation was voluntary, and informed consent was obtained prior to data collection. Responses were anonymized to ensure confidentiality and encourage honest reporting.

To maintain consistency, the same core questionnaire and interview guide were used in both waves, with only minor updates for clarity. This continuity ensured comparability between datasets across the 12-year interval.

Data Management and Statistical Analysis

All responses were coded and entered into a secure database. Data cleaning procedures included range checks, cross-validation between interview notes and questionnaires, and removal of incomplete cases.

Statistical analysis was performed in three stages:

1. Descriptive Analysis: Frequencies, proportions, means, and medians were calculated for each marketing strategy. Results were summarized both at the level of individual strategies and at aggregated thematic categories (e.g., personal relations, promotional materials, financial incentives).

2. Inferential Analysis: Comparisons between 2013 and 2025 were conducted using:

- b. Independent-sample t-tests with Welch's correction for mean differences in Likert-scale scores.
- c. Chi-square tests of independence for distributional shifts across response categories.

- d. Effect sizes were calculated (Cohen's *d* for mean differences, Cramer's *V* for chi-square tests) to assess the magnitude of changes.
- e. To address multiple testing, the Benjamini–Hochberg false discovery rate (FDR) correction was applied. [21]

3. Integration of Qualitative Data: Thematic analysis of interview transcripts was conducted to identify explanatory patterns and contextualize quantitative findings. Insights from interviews were triangulated with statistical results to provide a more comprehensive interpretation.

All analyses were performed using Python (pandas, scipy, statsmodels) and results were reported with 95% confidence intervals where applicable.

Results

Strategy Category Means and Rankings

Table 1 below summarizes the weighted mean effectiveness for each strategy category in 2013 and 2025, along with the observed change. Higher mean indicates stronger perceived effectiveness.

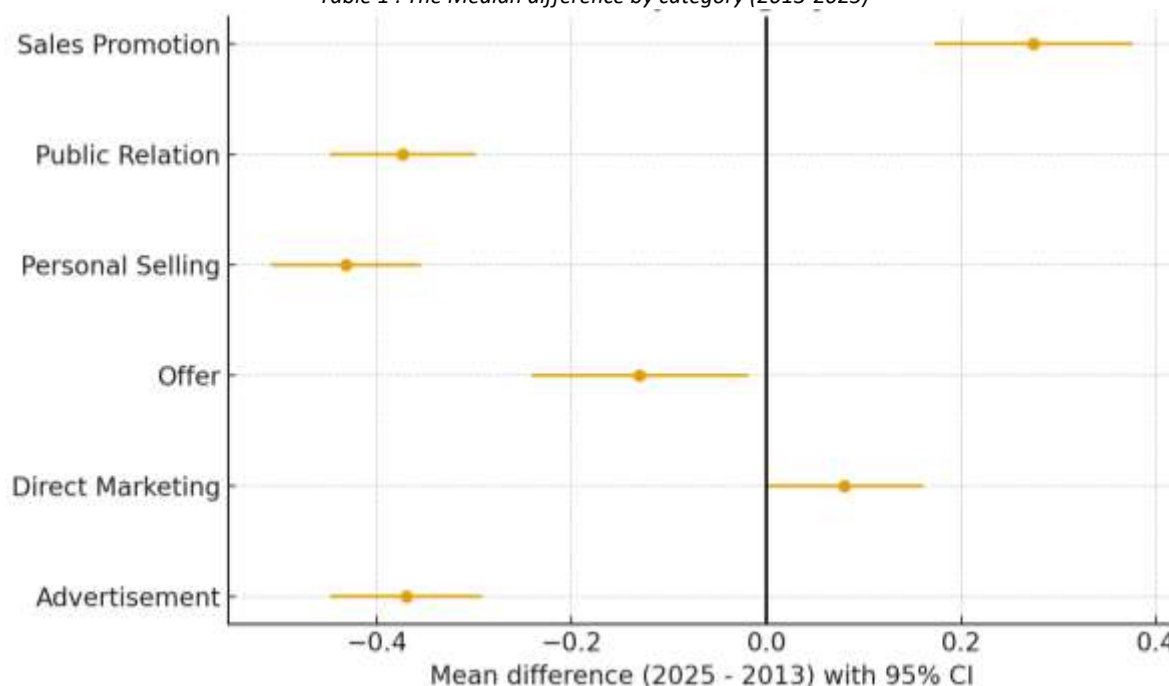
- Rankings (2013): The category rated highest in 2013 was *Sales Facilitation* (mean≈3.905), followed by *Public Relations* (3.798) and *Personal Selling* (3.576). Mid-range was *Sales Promotion* (2.973). The lowest were

advertising (2.543) and *Direct Marketing* (2.000), indicating these were viewed as relatively ineffective. The median of the six category means in 2013 is approximately $(3.576+2.973)/2 \approx 3.27$ on the 1–5 scale, indicating a “moderate” typical effect.

- Rankings (2025): By 2025, *Sales Facilitation* remained highest (3.775), but *Public Relations* (3.424) and *Sales Promotion* (3.247) switched positions: sales promotion rose above personal selling. *Personal Selling* dropped to 3.144. *Advertising* (2.155) and *Direct Marketing* (2.080) remained lowest. The 2025 median of category means is $\approx(3.144+3.247)/2 = 3.20$, virtually unchanged from 2013, again near the mid-point of the scale.

Thus, across both years, *Offers/price promotions* and *Public Relations* had the highest perceived impact, while *Direct Marketing* and *traditional Advertising* had the lowest. *Sales Promotion* (e.g. gifts, discounts) gained in standing by 2025, overtaking *Personal Selling*. Overall, four of six categories showed mean declines (PR, PS, Advertising, and Sales Facilitation), whereas *Sales Promotion* and *Direct Marketing* saw small increases. The average (median) effect stayed around “Moderate.”

Table 1 : The Median difference by category (2013-2025)



Findings

Examining the detailed sub-strategies reveals several notable points:

- **High-rated sub-strategies:** In 2013, the single highest-scoring item was “*physician relationship building*” under Personal Selling (mean≈4.404), reflecting very strong perceived impact. Other top items included “*frequent pharmacy visits*” (Public Relations, 4.152) and “*offer to pharmacies*” (Sales Facilitation, 4.035). These all indicate strong personal or relational marketing tactics. In 2025, “*offer to pharmacies*” actually increased slightly to 4.360 (becoming the top mean overall), and “*frequent visits*” was slightly lower (3.265). Notably, the “*offer to pharmacies*” sub-strategy saw an increase of +0.325 from 2013, remaining the most effective tactic.
- **Low-rated sub-strategies:** At the other extreme, all three Direct Marketing items (e.g. “*WhatsApp/Telegram messages*”, “*cold calls*”, “*non-presence mailings*”) were rated very low in both waves (2013 means ≈1.92–2.06, 2025 means ≈2.02–2.16). These are the lowest of all sub-strategies, consistent with them being seen as ineffective. In fact, “*WhatsApp/Telegram*” barely changed (1.920→2.060). Traditional advertising media like “*poster in pharmacy*” and “*product labeling*” also had low means (around 2.43–2.47 in 2013, dropping to 1.94 in 2025).
- **Largest increases:** The greatest gain was in “*shelf design*” (Sales Promotion), which rose from 2.553 in 2013 to 3.270 in 2025 (+0.717). Other notable improvements were “*sampling to doctors*” (Personal Selling: +0.427) and “*field representative visit to physicians*”

(Public Relations: +0.416). “*Pamphlet*” (Advertising) also rose (+0.384). These reflect some traditional sales tools gaining relevance. The item “*offer to pharmacies*” (Sales Facilitation) was already high and increased modestly (+0.325).

- **Largest declines:** The steepest drop occurred in “*physician relationship building*” (Personal Selling), from 4.404 to 3.160 (–1.244). “*Personal selling skills*” fell by –0.931 (3.971→3.040). Among PR items, “*frequent visits*” fell by –0.887 (4.152→3.265) and “*seminars*” by –0.563. In Advertising, “*brochures*” dropped –0.845 (2.875→2.030). “*Offer to customers*” (Sales Facilitation) also decreased by –0.586. Other items saw smaller declines (often <0.5). In summary, the most highly valued personal/face-to-face tactics in 2013 lost ground by 2025, whereas some promotional and design elements improved (Table 2, below).

Summary of changes: In general, *Personal Selling* sub-items showed mixed changes: while providing samples improved, building physician relations and doctor-facing skills declined. *Public Relations* items mostly declined. *Sales Promotion* sub-items all improved slightly. *Advertising* was mixed (pamphlet up, poster/brochure down). *Sales Facilitation* was split: offers to pharmacists remained high, while offers to customers dropped. *Direct Marketing* stayed low and essentially unchanged. These item-level patterns align with the category means noted above.

Table 2: Selected sub-strategy weighted means and changes

Strategy Category	Sub-Strategy	Mean 2013	Mean 2025	Change
Personal Selling	Physician relationship	4.404	3.160	–1.244
	Personal selling skills	3.971	3.040	–0.931
	Sample distribution to doctors	2.733	3.160	+0.427
Public Relations	Frequent pharmacy visits	4.152	3.265	–0.887
	Seminars for pharmacists	3.943	3.380	–0.563
Sales Promotion	Shelf design in pharmacy	2.553	3.270	+0.717
	High-value gifts to pharmacies	3.220	3.210	–0.010
Sales Facilitation	Offer to reduce price (customer)	3.776	3.190	–0.586
	Offer to reduce price (pharmacist)	4.035	4.360	+0.325
Advertising	Pamphlet (flyers)	2.326	2.710	+0.384
	Posters in pharmacy	2.469	1.940	–0.529
Direct Marketing	WhatsApp/Telegram messages	1.920	2.060	+0.140
	Calling pharmacies	2.059	2.160	+0.101

The results show that the *median strategy effect* (defined as the median of the six category means) remained essentially unchanged at around 3.20–3.27 on the 5-point scale, i.e. “moderate” effectiveness. In both years, only

one or two strategies had means above 3.5 (notably sales facilitation and PR), suggesting most strategies were seen as moderate or lower in impact.

Table 3 (summary of inferential outputs for categories):

Category	Mean 2013	Mean 2025	Mean diff (2025–2013)	Welch t	df	p (two-tailed)	Cohen's d (direction = 2013–2025)	χ^2 (2×5)	p (chi ²)	Cramér's V
Advertisement	2.5249	2.1550	−0.3699	9.2976	2870.9	2.76e−20	0.3300	106.206	4.69e−22	0.1804
Direct Marketing	2.0000	2.0800	+0.0800	−1.9478	2042.2	0.0516	−0.0810	13.966	7.40e−03	0.0755
Sales Facilitation (Offer)	3.9053	3.7750	−0.1303	2.2903	1286.6	0.0222	0.1185	55.504	2.55e−11	0.1846
Personal Selling	3.5756	3.1440	−0.4316	11.0005	3386.2	1.11e−27	0.3555	142.985	6.48e−30	0.1875
Public Relations	3.7978	3.4243	−0.3735	9.8406	3045.0	1.62e−22	0.3262	177.371	2.74e−37	0.2083
Sales Promotion	2.9725	3.2467	+0.2741	−5.2761	2247.2	1.45e−07	−0.2135	86.784	6.35e−18	0.1884

Statistical significance: Five of six categories show statistically significant changes between 2013 and 2025 by both tests:

- Advertisement: mean decreased significantly (mean −0.37), Welch t large, $p \ll 0.001$; χ^2 also highly significant ($V \approx 0.18$). Practical meaning: pharmacies rated advertising methods *lower* in 2025 than in 2013.
- Personal Selling: large and highly significant decline (mean −0.43; $p \ll 0.001$; Cohen's $d \approx 0.36$; $\chi^2 p \ll 0.001$; $V \approx 0.19$).
- Public Relations: significant decline (mean −0.37; $p \ll 0.001$; $d \approx 0.33$; $\chi^2 p \ll 0.001$; $V \approx 0.21$).
- Sales Facilitation (Offers): small but statistically significant decline (mean −0.13; $p \approx 0.022$; small $d \approx 0.12$; $\chi^2 p \ll 0.001$ and $V \approx 0.185$ indicates distributional change is meaningful).
- Sales Promotion: increased significantly (mean +0.274; $p \approx 1.45e-7$; Cohen's $d \approx -0.21$ but direction here indicates 2025 > 2013).

- Direct Marketing: marginal (t-test $p \approx 0.0516$; $\chi^2 p \approx 0.0074$). The chi-square indicates a statistically detectable distributional change ($V \approx 0.075$ — small), but the mean shift is small (+0.08) and only borderline significant on the Welch test. In practice, Direct Marketing remains among the least effective categories. Multiple comparison note (categories): Applying Bonferroni correction for the six category tests sets $\alpha_{\text{adj}} \approx 0.0083$. Under that conservative threshold, Advertisement, Personal Selling, Public Relations, and Sales Promotion remain significant; Sales Facilitation's t-test $p \approx 0.022$ would not pass Bonferroni, but its $\chi^2 p$ is very small — so the distribution changed even if the mean shift is small. Direct Marketing's mean change does not survive a strict Bonferroni correction, though its distributional $\chi^2 p$ is small ($p \approx 0.0074$) and close to the Bonferroni threshold. [19]

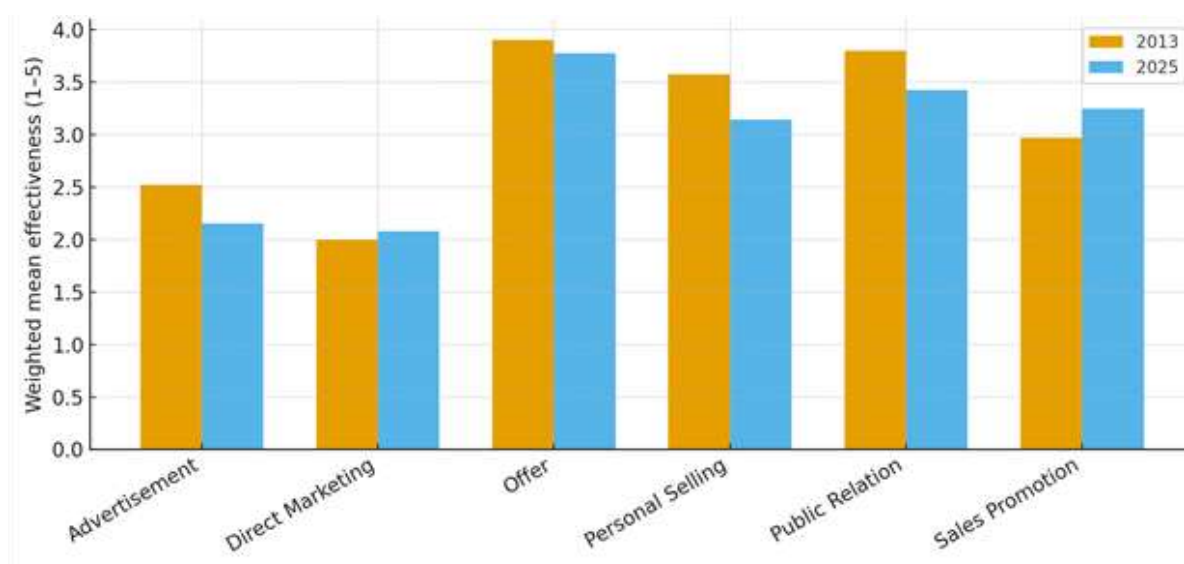


Figure 1: Category mean (2013-2025)

Below are the most substantively important item-level results (selected because effect sizes are large or changes are substantively noteworthy). I list the item, the two means, the (2025 – 2013) mean change, the Welch t and p, Cohen's d, and the chi-square result (χ^2 and Cramér's V). All p-values below are two-tailed. [20]

Top declines (large negative mean change and large effect size):

- 'Physician relation' (Personal Selling): mean fell from 4.404 (2013) to 3.160 (2025) → mean change -1.244 . Welch t extremely large, $p < 0.001$, Cohen's d ≈ 1.315 (very large). $\chi^2 p < 0.001$; Cramér's V ≈ 0.595 (very large). *Interpretation*: a very strong and statistically robust reduction in pharmacies perceiving physician-relationship work as effective influence on prescriptions or pharmacy outcomes.
- 'Personal selling skills' (Personal Selling): 3.971 → 3.040, -0.931 , t large, $p < 0.001$, d ≈ 0.861 , $\chi^2 p < 0.001$, V ≈ 0.465 . Large decline. Top increases (positive mean change, notable effect)
- 'Offer to pharmacies / price offer for pharmacist' (Sales Facilitation / Offer): 4.035 → 4.360, $+0.325$, Welch t $p < 0.001$, d ≈ -0.347 (direction indicates 2025 higher), $\chi^2 p < 0.001$, V ≈ 0.211 . *Interpretation*: offers targeted to pharmacies remained highly effective and increased further.
- 'Shelf design in pharmacy' (Sales Promotion): 2.553 → 3.270, $+0.717$, t $p < 0.001$, d ≈ -0.559 , $\chi^2 p < 0.001$, V ≈ 0.290 . Considerable increase

in perceived effectiveness of in-store display/shelf presentation.

- 'Sampling to doctors' (Personal Selling): 2.733 → 3.160, $+0.427$, t $p < 0.001$, d ≈ -0.353 , $\chi^2 p < 0.001$, V ≈ 0.215 . Samples became more effective (or more valued) by 2025.

Other notable item-level changes

- Brochures (advertising) dropped substantially: 2.875 → 2.030 (-0.845), t $p < 0.001$, d ≈ 0.730 , $\chi^2 p < 0.001$, V ≈ 0.366 .
- Poster in pharmacy dropped: 2.469 → 1.940 (-0.529), t $p < 0.001$, d ≈ 0.486 , $\chi^2 p < 0.001$, V ≈ 0.251 .
- Pamphlet actually rose modestly: 2.326 → 2.710 ($+0.384$), t $p < 0.001$, d ≈ -0.349 , and $\chi^2 p < 0.001$. (So not all print materials behaved the same.)

Summary of item-level inference:

- The largest and most robust declines occurred in items associated with *interpersonal competency and physician-facing personal selling* (large d and very large Cramér's V).
- The largest increases occurred in *sales-promotion / in-store tactics* (shelf design, sampling, offers to pharmacies).
- Traditional mass print advertising (posters, brochures) experienced significant decline, whereas a narrow subset of advertising (pamphlets) rose modestly.
- Direct marketing items (calls, messaging) generally remained low and showed at best small or borderline changes.

Discussion

This study provides a comprehensive, longitudinal perspective on how pharmacists' perceptions of pharmaceutical marketing

strategies in Iran have evolved from 2013 to 2025, revealing significant shifts in perceived effectiveness that carry direct implications for strategic decision-making, regulatory oversight, and the optimization of promotional practices in the pharmaceutical industry. These changes reflect evolving professional roles, regulatory environments, and operational challenges within community pharmacies, highlighting the importance of aligning marketing strategies with pharmacists' perspectives to ensure both effectiveness and ethical practice. [23]

A clear shift occurred in the composition of perceived effectiveness. Statistical tests indicate substantive declines in the perceived impact of personal selling (particularly physician-relationship aspects and representative skill), public relations activities, and traditional advertising. Cohen's d values for top personal-selling items exceed 0.8–1.3 (large to very large effects), and Cramér's V values are in the large range ($V > 0.3$ –0.5), showing that pharmacists in 2025 perceive direct interpersonal selling as much weaker than in 2013.

In contrast, in-store and pharmacy-targeted tactics increased significantly. Sales-promotion tactics, especially shelf design and other point-of-sale measures, rose with moderate-to-large effects (Cohen's $d \approx 0.35$ –0.56, $\chi^2 p \ll 0.001$, $V \approx 0.29$). Pharmacy-directed offers also grew more influential, while direct marketing remained low-impact with only small or borderline changes. Although median category effects remained moderate (~ 3.2), redistribution of influence shows relational tactics weakening while transactional, point-of-sale tactics strengthened.

Regulatory and structural constraints may have reduced the effectiveness of visible advertising and rep-based persuasion. Behavioral adaptation and channel substitution appear to have occurred, as firms invested more in point-of-sale, shelf-space, and price incentives. Digital

saturation and trust issues limited the impact of direct marketing, while post-pandemic reductions in face-to-face contact may have shifted pharmacist expectations toward transactional levers.

Practical Implications

- Prioritize pharmacy-targeted offers and point-of-sale design, while avoiding purely price-based competition that could erode long-term margins.
- Recalibrate sales forces to support pharmacies operationally (e.g., stock management, clinical support) and adopt digital detailing tools.
- Improve the professionalism and targeting of digital outreach, such as educational e-detailing, instead of mass messaging. [22]
- Monitor actual sales and prescription outcomes to validate perceived effectiveness.

Limitations and Considerations

Data were analyzed at an aggregated level, preventing true paired analysis across identical pharmacies. Partial panel attrition and multiple item-level tests should be interpreted with caution. Statistical significance indicates perception changes, not causal effects; linking these results to behavioral outcomes would enhance validity.

We conclude that, between 2013 and 2025, pharmacists' perceptions of pharmaceutical marketing strategies in Iran changed meaningfully. Relationship-focused tactics, such as personal selling and PR, have declined in perceived impact, whereas in-store, point-of-sale, and pharmacy-directed offers have increased in influence. Direct marketing remains low-impact. These shifts likely reflect regulatory pressures, changes in information environments, and pandemic-related reductions in face-to-face engagement. Strategic adaptation in budget allocation, salesforce roles, and digital marketing is essential, and linking perception data to behavioral outcomes will further strengthen evidence for practice and policy.

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