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ORIGINAL

Identify barriers to efficient drug distribution and provide solutions to improve it

Identificar los obstáculos a la distribución eficiente de medicamentos y aportar soluciones para mejorarla

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Summary

Background: Management of drug distribution is considered the most critical manner in safe and fast drug delivery to pharmacies and healthcare units. This research was carried out to assess the barriers to efficient drug distribution and provide solutions to improve it in a Darupakhsh company, Tehran, Iran as a model.
Methods: Sampling was done using simple sampling method. Customers (pharmacies) were the main subjects of the study. The questionnaire contains a set of indicators to measure the relationship between customer expectations and marketing strategies population of this group. The sample size was estimated to be 108 pharmacies considering the significant level of 95% and the probability of error of 0.09 using the formula No 1. A total of 102 pharmacies were response to the questionnaire.
Results: Because the level of significance was equal to 0.000 and (< 0.05), it was conclude that the study's hypothesis, i.e. the satisfaction of the distribution company's customers, was effective on the drug distribution marketing strategy. Darupakhsh company had high capacity in drug delivery at the expected time and place with acceptable speed, and professional behavior of distributors, deliverers and sellers. However, several items such as provide accurate information about the status of each drug in the future timely referral to follow up claims, flexibility in payment terms, offer trade and cash discounts as expected, and reputation and credibility of the company should revise.
Conclusion: Drug distribution management is one of the most important healthcare related items, especially in diseases outbreaks.

Keywords: Drug delivery, management, darupakhsh company, pharmacies.

Resumen

Antecedentes: La gestión de la distribución de medicamentos se considera la forma más crítica en la entrega segura y rápida de medicamentos a las farmacias y unidades sanitarias. Esta investigación se llevó a cabo para evaluar los obstáculos a la distribución eficiente de medicamentos y aportar soluciones para mejorarla en una empresa de Darupakhsh, Teherán, Irán, como modelo.
Métodos: El muestreo se realizó mediante el método de muestreo simple. Los clientes (farmacias) fueron los sujetos principales del estudio. El cuestionario contiene un conjunto de indicadores para medir la relación entre las expectativas de los clientes y las estrategias de marketing de la población de este grupo. El tamaño de la muestra se estimó en 108 farmacias considerando el nivel de significación del 95% y la probabilidad de error del 0,09 mediante la fórmula nº 1. Un total de 102 farmacias respondieron al cuestionario.
Resultados: Dado que el nivel de significación fue igual a 0,000 y (< 0,05), se concluyó que la hipótesis del estudio, es decir, la satisfacción de los clientes de la empresa de distribución, era efectiva en la estrategia de marketing de la distribución de medicamentos. La empresa Darupakhsh tenía una gran capacidad de entrega de medicamentos en el momento y lugar esperados con una velocidad aceptable, y un comportamiento profesional de los distribuidores, repartidores y vendedores. Sin embargo, varios puntos como proporcionar información precisa sobre el estado de cada medicamento en el futuro remisión oportuna para el seguimiento de las reclamaciones, la flexibilidad en las condiciones de pago, ofrecer descuentos comerciales y en efectivo como se esperaba, y la reputación y la credibilidad de la empresa debe revisar.
Conclusión: La gestión de la distribución de medicamentos es uno de los puntos más importantes relacionados con la asistencia sanitaria, especialmente en los brotes de enfermedades.

Palabras clave: Distribución de medicamentos, gestión, farmacias.

Introduction

Since therapeutic options play a very sensitive role in maintaining the health and treatment of diseases in the community, it is a very important strategic commodity and has always been considered by health care providers[1]. Today, under the rules and regulations of the Iranian Ministry of Health, 92% of therapeutic options are supplied by 77 drug companies, mostly privately owned or covered by non-governmental organizations, and 8% of them are imported[2].

The drug that is thus provided to meet the needs of different segments of society should be in the form of a codified and defined system to enable its supply to different social strata that need to use the drug. This system is called the "drug distribution system"[3].

The drug distribution system directs the production or import of drugs to the level of consumption and supplies the present and demand system. This system must provide a reasonable and appropriate relationship between supply and consumption by providing a suitable access field, in a timely manner and in the shortest possible time. In general, the drug distribution process is affected by 3 categories[4]:

- Capacity and power of drug manufacturers and importers and their joining the drug distribution company
- Policies of the Department of Medicine, Food and Narcotics of the Ministry of Health
- Customer satisfaction (pharmacies and medical centers)

At present, what is called drug distribution in Iran is responsible for receiving drugs from importers or manufacturers and delivering them to pharmacies by 22 companies. Darupakhsh Company is one of the largest drug distribution companies in Iran and in terms of turnover is the first among them. The company faces a variety of challenges, and market management practices to identify the shortcomings and challenges and analyze the factors affecting marketing in order to achieve the desired results along with strong competitors in the company is essential and is very important.

The present survey was carried out to identify barriers to efficient drug distribution and provide solutions to improve it in A Darupakhsh company.

Material and methods

Study area

The survey was conducted on data abstained from years 2008-2009. This research is based on correlation research method. The statistical population in this study is all experts in drug distribution. But given that each of the factors influencing drug marketing strategies was related to a group of distribution company audiences, the statistical population of each questionnaire was determined separately and independently.

Sampling procedure

Sampling was done using simple sampling method. Customers (pharmacies) were the main subjects of the study. The questionnaire contains a set of indicators to measure the relationship between customer expectations and marketing strategies and in fact looks at the set of real and practical customer expectations that are widely available in the country's pharmacies.

Since it was not possible to count and distribute the questionnaire among all pharmacies, Tehran pharmacies, which had purchased more than 550 million Rials in 2007 were consider. A total of 541 pharmacies were selected as the statistical population of this group. The sample size was estimated to be 108 pharmacies considering the significant level of 95% and the probability of error of 0.09 using the formula No 1. A total of 102 pharmacies were response to the questionnaire.

Formula No 1

P = 0.05 Z = 1.96 d = 0.09

$$n = \frac{NZ_{a/2}^2 S^2 (1 - S^2)}{N\theta^2 + Z_{a/2}^2 S^2 (1 - S^2)}$$

$$n = \frac{Z_{a/2}^2 P(1-P)}{d^2}$$

Data analysis

The data obtained from the questionnaire were stratified and descriptive analysis was used to test partial and general hypotheses. Cronbach's alpha test was used to assess the validity of the questionnaire. To calculate the Cronbach's alpha coefficient, the variance of the scores of each subset of the questionnaire (or subtest) questions and the total variance were calculated. Then, the value of alpha coefficient was calculated using formula number 2.

Formula No 2

$$r_a = \frac{J}{J-1}\left(1 - \frac{\sum S_j^2}{S^2}\right)$$

Whereas:
J = Number of question or test question subsets
S_j^2 = Variance following j test
S^2 = Total test variance

In this research, in relation to the use of secondary data, an attempt has been made to use reliable data

and information that is approved by the organization's monitoring system, so the information is reliable and seems to be far from biases and distortions.

Results

Evaluation of the validity of the questions in questionnaire

For the questionnaire questions, Alpha = 0.81010 was obtained. Considering that the alpha value is greater than 0.7, it was concluded that the questionnaire was reliable.

Chi-square test to investigate the effect of distribution company customer satisfaction on drug distribution strategies

Table I shows the designed questionnaire. Because the level of significance was equal to 0.000 and was lesser than the error value of 0.05, so with 95% confidence, we conclude the study's hypothesis, i.e. the satisfaction of the distribution company's customers, was effective on the drug distribution marketing strategy.

Discussion

In recent years, many diseases have caused health problems, except among the people[5-11]. However, proper management of drug distribution can prevent severe epidemics. Distribution is an important activity in the integrated supply-chain management of pharmaceutical products.

The drug distribution network is one of the most important pillars of the Iranian pharmaceutical system which plays a vital role in rapid and easy access to drugs. The purpose of this study is to "explain the effective characteristics in attracting and gaining the trust of drug manufacturers, customer satisfaction by observing the criteria of the Ministry of Health, Treatment and Medical Education and identifying the shortcomings of Darupakhsh company in the field of human drug distribution and strategies to achieve a "Distribution has been profitable and correct." Findings showed that the Darupakhsh company had the highest scores for the drug delivery at the expected time, drug delivery at the expected place, drug delivery speed as expected, and professional behavior of distributors, deliverers and sellers. While, the scores for the provide accurate information about the status of each drug in the future and predict the future timely referral to follow up claims, flexibility in payment terms, offer trade and cash discounts as expected, and reputation and credibility of the company were low. Sepahi et al[12] stated that, 11 complications were identified for the drug distribution network in Iran. Drug unavailability or shortage, supply of near-expiration drugs, supply of counterfeit drugs, improper sale of over-the-counter drugs, black market activity and drug trafficking, sharp price fluctuations, insufficient interaction with consumption pharmacist, high distribution costs, low distribution network performance in emergency deliveries, long time to search and find drugs (in case of certain drugs) and low quality of response and consumer complaints seem to be some of the complications identified in this study[12]. Also, Mojaradi and Mozaffari[13] in a research aimed at existing management in the drug supply chain using system dynamics simulation approach, assess the drug supply chain of Plavix drug on 2 levels of pharmacies and hospitals. Some research also only identifies some distribution network problems. In this regard, Ekhtiari et al[14] conducted a study entitled

Table I: Designed questionnaire in the present study.

No questions	Questions	Responses (%)			
		Very low	Low	Medium	High
1	Drug delivery at the expected time (during daily activities)	-	-	7 (6.86)	95 (93.13)
2	Drug delivery at the expected place	-	2 (1.96)	8 (7.84)	92 (90.19)
3	Drug delivery speed as expected (time interval from order announcement to drug receipt)	5 (4.90)	3 (2.94)	10 (9.80)	84 (82.35)
4	Professional behavior of distributors, deliverers and sellers (having job qualifications)	4 (3/92)	2 (1.96)	15 (14.70)	81 (79.41)
5	Pay attention to the opinions and reflect them to the officials and provide timely answers	7 (6.86)	5 (4.90)	25 (24.50)	65 (63.72)
6	Politeness in the behavior of distributors, deliverers and sellers	2 (1.96)	4 (3/92)	20 (19.60)	76 (74.50)
7	Present scientific and pharmacological information, especially regarding new drugs to physicians before drug distribution	9 (8.82)	8 (7.84)	31 (30.39)	54 (52.94)
8	Safely drug delivery	4 (3/92)	6 (5.88)	55 (53.92)	37 (36.27)
9	Provide accurate information about the status of each drug in the future and predict the future	10 (9.80)	51 (50.00)	34 (33.33)	7 (6.86)
10	Submit invoices at the expected time and in a timely manner	20 (19.60)	17 (16.66)	33 (32.35)	32 (31.37)
11	Provide drug brochures and pharmaceutical scientific information	2 (1.96)	7 (6.86)	11 (10.78)	82 (80.39)
12	Timely referral to follow up claims	12 (11.76)	18 (17.64)	48 (47.05)	20 (19.60)
13	Flexibility in payment terms	8 (7.84)	42 (41.17)	31 (30.39)	21 (20.58)
14	Offer trade and cash discounts as expected	15 (14.70)	35 (34.31)	35 (34.31)	17 (16.66)
15	Reputation and credibility of the company	22 (21.56)	29 (28.43)	26 (25.49)	25 (24.50)

"Assessing the status of supply, distribution and Prescribing medicine in pharmacies of Kermanshah according to Food and Drug Administration standards.

Dzierba et al[15] reported that drug delivery well management was the most important factor affected the well control of the corona virus diseases 2019 (COVID-19) in New York city, USA. Grujic et al[16] identified 78 risk factors in the distribution channels of drugs and pharmaceutical services in Serbia. The results of the research combined separate evaluations for risk factors in all categories for easier data analysis. After data were obtained, results were arranged to show which risk factors had the biggest influence upon the distribution of drugs and to determine the negative effects they can produce. The research of risks was done primarily to help the representatives of distribution channels gain better insight into drug distribution[16]. Kumar and Jha[17] stated that there are cases of unresolved customer complaints and batch failures originated due to inadequacies during distribution of pharmaceutical products. In absence of established quality risk management system during product shipment, there is no effective preventive plan related to risk factors. A corollary of manufacturing quality risk management has been drawn to the distribution of pharmaceutical products through this study. The quality risk management during pharmaceutical distribution may be useful to avoid market complaints, drug recalls, and regulatory actions[17].

Investments on measuring patients' needs correctly, supporting drug retailing competitive brands development, improving drug distribution system information comprehensive system throughout the country within needs measurement loops, network inventory, production and importation, improving the utilization of modern tools and technologies such as internet-based sales, seller-free shops, establishing electronic files for patients and similar ones, utilizing direct sale methods and fostering the roles of potentialities such as insurance in planning, decision making and monitoring drug distribution system countrywide are some of the solutions obtained from this research that are used to improve the drug distribution system in the country.

Conclusions

This survey showed that the Darupakhsh company had a high capacity in drug distribution among different customers, particularly pharmacies and healthcare centers. It seems that the company had high capacity in drug delivery at the expected time and place with acceptable speed, and professional behavior of distributors, deliverers and sellers. However, several items such as provide accurate information about the status of each drug in the future timely referral to follow up claims, flexibility in payment terms, offer trade and cash discounts as expected, and reputation and credibility of the company should revise. Finally, the important role of drug distribution system was studied in this survey. The present study was preliminary survey in this field. Thus, several multifactorial studies should perform to identify barriers in the drug delivery system.

Conflict of interests

The authors have no conflict of interest.

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