Review Article

Implementation of cost containment strategy in pharmacy: A literature review

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ABSTRACT

Healthcare expenditure in the pharmaceutical sector is always growing yearly. It demands cost-containment policies. This systematic literature reviewed types of cost containment strategy applied in many countries worldwide. Articles published from 2011 until 2021 were identified from PubMed, Scopus, and ScienceDirect. Key search terms included "Cost containment" and "Pharmacy". Preferred Reporting Items for Systematic Reviews and Meta-Analyses (P.R.I.S.M.A.) methodology was followed. The cost containment was categorized by type of population, Health facilities, Countries, Method of Study, and kind of cost containment. A total of 2,909 records were found through database searching of PubMed (140), Scopus (1,687) and ScienceDirect (1,082). After a full-text screening, 28 articles were included in the review. Most studies were conducted on pricing limits, followed by reduce overtreatment and drug waste. The strategy that resulted in the greatest cost savings was the drug waste, and tendering, followed by reduce overtreatment. This study provides insight of cost containment strategy in pharmacy from several countries that might be adopted for implementation in other settings.

Keywords: Cost containment, Pharmacy, Strategies, Healthcare cost

Introduction

Global health spending has steadily increased to US$7.8 trillion in 2017, or about 10% of G.D.P. and $1,080 per capita – up from US$7.6 trillion in 2016 [1]. Global health expenditures have more than doubled over the last two decades, reaching US$ 8.5 trillion in 2019 and accounting for 9.8% of G.D.P. (up from 8.5 percent in 2000) [2].

The health sector continues to expand faster than the rest of the economy. Between 2000 and 2017, global health spending increased at a real rate of 3.9 percent per year, while the economy expanded at a rate of only 3.0 percent per year [1]. According to the World Health Organization, healthcare made up 7.9% of Europe's gross domestic product (G.D.P.) in 2015 [1]. The rising costs of new healthcare technologies and treatments, combined with the increasing needs of aging populations, underscore the importance of prudent resource allocation [3].

Aging populations and workforce, technological advancements, changing preferences as a result of better earnings, higher wage growth as a result of lagging productivity development, and increased coverage are all factors that contribute to an increase in healthcare costs. Inefficiencies in the healthcare sector include unnecessary care, waste in healthcare, inappropriate clinical practice variation, administrative burdens, fraud, and abuse [4].

The health sector is susceptible to inefficiencies such as unnecessary care, waste in health care, unjustified clinical practice variations, administrative burdens, corruption, and abuse. The limited capacity of governments and the economy to continue rapid financing growth in health care, combined with an awareness of health care's inefficiencies, provide policymakers

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with a compelling argument for reining health care costs. Accessible, cost-effective, and high-quality healthcare delivery is a global imperative for governments and health systems. However, health system resources continue to be constrained, and health decision-makers continue to investigate alternate funding models to improve the efficacy and quality of health services [5]. Each country must implement a cost containment strategy as this is a critical management function that assists in cost reduction by ensuring that only the costs necessary to meet financial targets are incurred [6]. This article aims to do a descriptive analysis of the cost containment strategies implemented in the world.

Materials and Methods

The P.R.I.S.M.A. diagram was used to guide the selection of studies **(Figure 1)**. Pubmed, Scopus, and ScienceDirect database searches identified cost containment in pharmacies.
A total of 2,906 records were continued to the screening process after removing the duplication.The 45 titles and abstracts were screened for eligibility; 2,615 studies were excluded due to exclusion criteria; then, Twenty-eight papers as the conclusive studies examined cost containment in pharmacy.

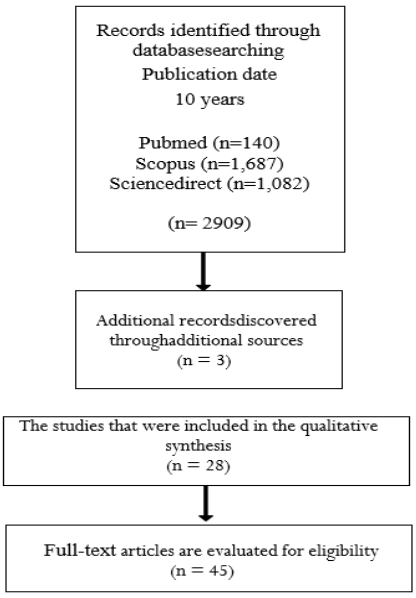

Figure 1. Flowchart of article searching

Results and Discussion

Information obtained from the articles extraction were presented in **Table 1** specifically in study design, countries and health facilities where the cost containment strategies were applied. Meanwhile **Table 2** described more detail regarding the cost containment strategies of each artcicle.

Table 1. Study Design, Cuntries and Health Facility

No	Study	Country	Study Design	Setting of the Health Facility
1	Adade (2020)	Morocco	Observational	National Oncology Institute
2	Bao *et al*. (2015)	China	A Longitudinal and a cross-sectional analysis	Hospitals
3	Fasola *et al*. (2014)	Italy	Observational	The Oncology Department of Udine
4	Fatokun *et al*. (2013)	Malaysia	Observational	The product registration databases of the Malaysian drug regulatory authority
5	Gipson *et al*. (2017)	U.S.A.	Experimental	Hospital
6	Han *et al*. (2015)	South Korea	Observational	N.H.I.S. claims data for clinics providing primary care in an outpatient facility
7	Hren (2013)	Hungary	Observational	Data on the Hungarian prescription drug market,
8	Kamata *et al*. (2020)	Japan	Cohort study	National Cancer Center Hospital East
9	Kang *et al*. (2018)	South Korea	An interrupted time series study	National Health Insurance claims data from 2010 to 2013
10	Kenneally *et al*. (2012)	Ireland	Observational	The Irish health system Data
11	Kim *et al*. (2021)	South Korea	An Interrupted time series model	Clinics
12	Kojima *et al*. (2012)	U.S.A.	Experimental	Geriatric Care
13	Kibicho *et al*. (2012)	Amerika Serikat	A Time series analysis	Michigan's Medicaid outpatient
14	Kwon *et al*. (2019)	South Korea	A Time series analysis	Korean National Health Insurance database from January 2007 until December 2016
15	Kwon *et al*. (2013)	South Korea	An interrupted time series analysis	The National Health Insurance claims data for 60 months between 2006 and 2010
16	Lucas *et al*. (2021)	U.S.A.	Matched, longitudinal cohort study.	Blue Cross and Blue Shield

17	Mardetko and Kos (2018)	Slovenia	Observational	Publication issued by the Agency for Medicinal Products and Medical Devices of the Republic of Slovenia
18	Olga *et al*. (2014)	Greece	Observational	A National Organization for Health Care Services Provision (E.O.P.Y.Y.)
19	Petrou dan Talias (2014)	Cyprus	Observational	Public Pharmaceutical sales of 2011 and the official 2011 pricelist of the Ministry of Health
20	Priya *et al*. (2021)	India	Cohort study	Hospital
21	Sharma dan Gupta (2013)	India	Quasi-Experimental	Hospital
22	Usher *et al*. (2012)	U.S.A.	Observational	Community
23	Russi *et al*. (2017)	Italy	Observational and monocentric study	Hospital
24	Sweet *et al*. (2020)	USA	A longitudinal, Observational analysis	Annual health claim data
25	Tramontano *et al*. (2016)	Italy	Experimental	The Centralized Unit for Handling Antineoplastic of National Cancer
26	Destiani *et al*. (2014)	Indonesia	A cross sectional study	Hopital
27	Istianisa dan Oktamianti (2017)	Indonesia	Cross-Sectional Observation	Hospital
28	Syaripuddin *et al*. (2014)	Indonesia	A cross sectional non intervention study	Hospital

Table 2. Cost Containment Strategies

	Study	Type of Cost Containment	Cost Containment Strategy Detail	Result
	Price Control			
1	Kwon *et al*. (2013)	Price limit	Price-reduction	The third intervention boosted drug spending by KRW 599.67 million (USD 523,726) (p = 0.0781). Volume rose slowly but steadily.
2	Kang *et al*. (2018)	Price limit	The drug price reduction policy	The drug price reduction program reduced pharmaceutical spending (–13.22%, P 0.0001), but the trend (–0.01%, P= 0.9201) did not change significantly from the pre-intervention period.
3	Kwon *et al*. (2019)	Price limit	Discounts on off-patent drugs	Drug spending reduced by 186.22 billion Korean Won (K.R.W.) (p 0.0001) and 1.33 billion K.R.W. (p = 0.002) after the price cut.
4	Usher *et al*. (2012)	Price limit and profit Control	Reduced off-patent prices, wholesale margin, pharmacy markup, and dispensing fees.	A 20% price cut on patent-expired products reduced expenses significantly. Lowered pharmacy and wholesale margins reduced spending on patented (and generic) products. Off-patent G.M.S. goods saw significant cost reductions (P0.01). After a 15% price cut in January 2009, off-patent expenses did not decrease significantly.
5	Fatokun *et al*. (2013)	Generic Substitution	Purchasing by maximizing Generic Drugs Savings	Delaying generic competition raises medicine prices and costs.
6	Syaripuddin *et al*. (2014)	Generic Substitution	Generic Drug Savings Maximization	Generic drugs can save Rp.28,000 every prescription, or 2 billion over six months.
7	Petrou dan Talias (2014)	Price Negotiations	Tendering	The tendering mechanism reduced value by 60.6% and prices by 39.39%. Generics reduced value (94.8%) and mean price (62.97%). Value and mean price reductions for branded products were 33.4% and 25.99%.
8	Mardetko and Kos (2018)	Price Negotiations	The generic reference pricing (G.R.P.) system on the prices and cost of medicines	Long-term G.R.P. performance was connected with a 45% decrease in average M.R.P. or a 20% cost reduction over a 2-year trial period.

	Market Oriented Policies			
9	Adade (2020)	Reduce Waste	Drug waste minimization	13.9% savings over a year (580,000 USD). Centralization reduces waste by an estimated 79.513.7%.
10	Fasola *et al.* (2014)	Reduce Waste	Drug waste minimization	45% less medication waste.
11	Tramontano *et al.* (2016)	Reduce Waste	Yervoy® a drug day,	Programming cancer therapies on drug day resulted in a very effective tool for pharmaceutical cost containment.
12	Russi *et al.* (2017)	Reduce Waste	Planning of the stock, drug day, and vial sharing	The management model (centralization of compounding + drug-day) allowed for savings of up to 11.1 percent of the drug's total cost.
13	Gipson *et al.* (2017)	Health I.T.	Computerized alerts Cost Alert	When comparing pre to post, there was a decrease in the use of high-cost drugs.
14	Sweet *et al.* (2020)	Health IT	A digital diabetes prevention program	Digital pay lowered health care spending in 1 year. Fewer hospital admissions and shorter length of stays reduced costs.
	Volume Control			
15	Kamata *et al.* (2020)	Reduce Overtreatment	Collaborative pharmacy services performed by pharmacists and physicians	Total medication expenses were reduced by ¥6984,637,
16	Kojima *et al.* (2012)	Reduce Overtreatment	Interventions by geriatric medicine on treatment costs among long-term care residents with polypharmacy.	Mean monthly medicine costs per resident dropped from $874.27 to $843.56 after the intervention. (P < .0001).
17	Priya *et al.* (2021)	Reduce Overtreatment	Clinical pharmacist Intervention	Antibiotics (24.23%), proton-pump inhibitors (13.27%), and analgesics (12.34%) lowered therapy costs. Responses to pharmacist intervention varied. 53% stopped the medicine, 21% changed the brand, and 20% modified dosing.
18	Olga *et al.* (2014)	Reduce Overtreatment	Pharmacist Intervention	Savings (cost containment) of Rp 8,881,440- can be achieved by the use of a mix of empiric antibiotics. ceftazidime-levofloxacin.
19	Bao *et al.* (2015)	Reduce Overtreatment	Action Plan for antibiotic Stewardship targeting antibiotic misuse in public hospitals	Inpatient and outpatient prescribing rates were lowered to 35.3% and 12.9%, respectively. The frequency of antibiotic use was reduced to 35.9 DDD/100 bed-days. Antibiotic prices fell by $6.95 on average (se = 1.57; p 0.001).
20	Lucas *et al.* (2021)	Benefit Package	Pharmacy Benefit	Chronic illness patients with an integrated pharmacy coverage had lower medical cost growth.
	Combination			
21	Kenneally *et al.* (2012)	Price limit, Payment Reform, Cost Sharing,Profit control	Reducing the ex-factory price of drugs, pharmacy dispensing fees and community drug scheme coverage, and increasing patient copayments	This policy package cut public medication spending by €380m in 2011.
22	Han *et al.* (2015)	Payment Reform and Price limit	Incentive programs and price cuts of listed medicines	Effect of the Prescription Incentive Program • Pharmaceutical spending per claim fell immediately • Antibiotic prescribing rate trended downward Drug prices immediately lowered pharmaceutical expenditures for all ailments, but the effect was short-lived.
23	Kim *et al.* (2021)	Payment Reform and Reference Price, Cost Sharing	The four main policies we focused on are the Outpatient Prescription Incentive Program, the Uniform Ceiling Prices for Generics, the Pay-for-Performance Program, and the Extended Incentive Program.	Significant price cuts and incentives for more efficient medicine prescriptions resulted in an immediate reduction in clinics' monthly drug expenses.

24	Kibicho *et al.* (2012)	Benefits Package, Price Negotiations, the Reference price	(1) a preferred drug (2) a joint purchasing arrangement (3) a maximum allowable cost system for pharmacy reimbursement (4) a multistate pooling supplemental rebate arrangement	Preferred lists boosted market share and cut daily costs. The maximum permitted cost policy increased daily costs and didn't save money. Joint and multistate arrangements didn't affect daily cost.
25	Olga *et al.* (2014)	Price limit, Cost Sharing, and generic substitution	Cost-sharing levels, reductions in prices, and generic substitution.	77% of prescribed drugs required 25% cost-sharing in 2013, up from 53% in 2012. In 2013, the average cost-sharing burden for medications was 18%, up from 13.3% in 2012. Average package price dropped 28% in 2013, from €17.8 to €12.8.
26	Sharma dan Gupta (2013)	Benefits package, Price Negotiations	List of essential drugs and procurement through centralized pooled system followed by setting up of Drugs & Therapeutic Committee	Average prescription spending rose from 3.63 to 5.16 percent, while hospital patient attendance increased 6-fold.
27	Istianisa and Oktamianti (2017)	Reduce overtreatment, Payment Reform	Clinical Pathway, formulary, dan incentive structure	Drug spending dropped 47%
28	Hren (2013)	Price limits, Payment Reform	Supply-side control • An introduction of a 12% statutory rebate/payback on reimbursed expenditure for both branded and generic firms, • pay sales representative registration fee, • price-volume agreements based Demand-side control • Reimbursement levels	Still estimate 14,000,000 in drug cost savings.

Study setting

Study settings vary in many countries all over the world.

There are six studies in the United States [7-12]. There are five studies from South Korea [13-17]. There are 3 studies from Indonesia [18-20] and Italy 3 [21-23]. One studies from Japan [24] and India [25, 26]. One study from Morocco [27]. China [28]. Malaysia [29]. Hungary [30], Slovenia [31], Greece [32], Ireland [33], and Cyprus [34],

Health facility

There were 11 studies of national health data followed by eight hospitals where cost containment strategies were implemented. Two clinical research investigations were undertaken—two private insurance data. The pharmacy community conducted one study.

Study design

The most research method was retrospective, conducted in ten studies. Interrupted time series and pre-post intervention followed by four studies. Three studies on cross-sectional. Two studies on the prospective study, time series study, and longitudinal study. The last research matched a case-control study on one study.

Cost containment strategy

Cost containment strategies have divided into four primary targets [35]. The first is price control, budget, volume control, and market-oriented strategy. Budgeting consists of macro and sector. Price control is divided into reimbursement and production cost. Reimbursement prices include price limits, fee schedules, reference pricing, and price negotiations. Production costs consist of generic substitution, profit controls, wage controls, and capital controls. Volume controls are divided into supply-side volume controls and demand-side volume control. Supply-side volume controls consist of reducing overtreatment, capacity control, access control, and labor restriction. Demand-side volume control consists of cost sharing, benefits packages, prevention, innovation control, and patient education. Market-oriented strategies structure is divided into structure, conduct and performance. The structure consists of purchaser, provider structure, decentralization, task substitution, full profit provision, anti-trust policy and risk distribution.

Conduct consists of payment reform, competition, coordination, consumer choice, contracting, and patient choice. The performance consists of Health I.T., tort reform, administration, transparency, management, reducing waste, reducing fraud, and innovation

Price controls

The United Nations (UN) report suggests that high-priced and expensive medications are a significant barrier to treatment access in low- and middle-income nations (LMICs). In the event of a serious or chronic sickness, drug expenses are frequently cited as the leading or second-leading cause of out-of-pocket expenses, which can be disastrous and push individuals from the middle and lower social groups into poverty [36]. The price control strategies include limits on reimbursements (price limits, fee schedules, price negotiations, or reference pricing) and controls of production factors (wages, profits, capital, or pharmaceutical inputs). We found 15 studies that use price

control strategies. We found 8 studies on price limits, Three studies on reference pricing, three on generic substitution, 3 on reference prices, two on profit control, and 3 on price negotiations. One study can contain more than one strategy.

Six types of policies concluded that price control policies are an effective way to reduce health expenditure. In the price limits strategies, the health expenditure reduction varied from 13.22% [14] to more than >50% [32]. In Ireland, reducing the ex-factory price of drugs caused a 40% price cut on the 300 most common off-patent drugs and a 20% and 30% price cut on generic medications [33]. Significant expenditure reductions were noted after introducing a 20% price cut to patent-expired products (off patents). The strategy reduces the wholesale margin from 17.66% to 10% [10]. In two research. [14, 16] prescribing behavior didn't change Prescription volume increased but was insignificant [17]. Interestingly the prescription volume was reduced by almost 60% of total pharmaceutical consumption [32]. Although the price reduction has successfully countered Korea's increasing pharmaceutical costs, the effect is temporary [13, 16].

The drug price reduction policies are an effective way in which to control the growth in health expenditure (–13.22%, P< 0.0001) while not negatively affecting changes in prescription patterns (–0.01%, P= 0.9201). The South Korean drug price reduction initiative did not affect healthcare providers' prescribing habits and did not boost the usage of pharmaceuticals not subject to this policy. Discounts on off-patent drugs made drug spending significantly drop with the price cut by 186.22 billion Korean Won (K.R.W.) ($p < 0.0001$), and the trend after the price cut also significantly decreased by 1.33 billion K.R.W. ($p = 0.002$). However, total expenditures were assumed to increase and return to their original level. The quantity prescribed had no significance with the price cut. The unit price dropped significantly ($\beta = -41.68$, $p < 0.0001$) as a result of the price cut, while the trend following the intervention increased ($\beta = 0.16$, $p = 0.656$) without significance [16].

The reference price strategy was found in three studies. All generic drug price ceilings are now uniformly set at 53.55% of the original drug's price before patent expiration [15]. There was an immediate drop after the overall price cut by the Uniform Ceiling Prices for Generics Program (Policy 2) for all target diseases. The decrease after the universal price cut by the Uniform Ceiling Prices for Generics was KRW 694 at the 10th and KRW 3850 at the 90th quantile [15]. Interestingly the generic price went down, but the maximum price increased the daily cost because more people bought the more expensive brands [8]. Preferred Lists have been applied to the Michigan Medicaid program in the second study. They were expected to reduce prescription costs by encouraging the use of generic products that are less expensive than chemically-equivalent brand products. The preferred list generated the most significant cost savings of the four policies, accounting for 94% [$43,205/$46,195] of annualized cost savings and 107% [$115,213/$107,285] of the total cost savings. The third study applied Slovenia's generic reference pricing (G.R.P.) system. In the 2-year study period, the long-term performance of the generic reference pricing (G.R.P.) system was associated with an approximate 45% decrease in the average maximum reimbursable price (M.R.P.) or an approximate 20% cost reduction. For each M.R.P. update period, the G.R.P. reduced the cost based on the maximum allowed price of approximately 30%. In the long term, the G.R.P. system effectively reduced medicine prices and reimbursed product costs [31].

Profit control has been found in two journals. In the first Journal, reducing wholesale margin and pharmacy markup (profit control) and dispensing fee rearrangement had the largest impact on reducing pharmaceutical expenditure than another intervention in that study. The strategy reduces the wholesale margin from 17.66% to 10% and a reduction in the retail markup on the Drugs Payment Scheme from 50% to 20% [10]. In the second Journal, reducing pharmacy dispensing fees and markups caused a reduction in payments to community pharmacies via a new dispensing fee structure, lowering patient care fees and ending some special payments. Drug Payment Service (D.P.S.) scheme retail markup was reduced from 50% to 20%. Wholesale markup was reduced from 17.66% to 8% [33].

Two journals found a generic substitution strategy [19, 32]. In journal by [19], it can save Rp.2.082.912.636. The highest price comparison between branded and generic drugs is 59 times for antibiotics. The introduction of generics and reduction in prices of off-patent drugs From January 2012 to August 2013, pharmaceutical prices were reduced by 28% on average [19]. The introduction of generics and reduction in prices of off-patent drugs. During the period January 2012 to August 2013, pharmaceutical prices were reduced by 28% on average (from €17.8 per package in January– March 2012 to €12.8 per package in April–August 2013), while the prices of specific therapeutic categories were reduced by more than 50% in the same period [32]. The time for generic to enter the market in Malaysia is significantly delayed beyond the day following the basic patent expiration of innovator products, thus delaying the onset of generic competition with potentially negative implications on overall drug prices and pharmaceutical expenditures [29]. The introduction of inexpensive generic pharmaceuticals to the market tends to increase competition and exert cost-cutting pressure on manufacturers of brand-name drugs [37].

The price negotiation was found in three journals. In the first Journal, the tendering approach resulted in a 60.6% reduction in value and a 39.39% reduction in the average price by comparing value (weighted price) reduction from the perspective of a public payer utilizing tendering prices to official pharmacy procurement prices for the same volume of products (strength and package). The value (94.8 percent) and the average price of generics decreased the most (62,97 percent). Branded products achieved a 33.4% decline in value and a 25.99% fall in mean price, while Top Twenty products earned a 29.4% decrease in value and a 23.4% decrease in mean price. These products were selected based on clinical significance, volume, and value [34]. In the second Journal, bulk buying through a centralized procurement cell not only resulted in savings in overall expenditure on the acquisition of quality pharmaceuticals but also directly benefited the public by increasing the supply of essential drugs [26]. In the

third Journal, the joint pool shifted market share from generics to branded and non-preferred medications. The price of brands, generics, and non-preferred medications fell, whereas the price of preferred drugs rose. Due to these compromises, the daily cost was not greatly altered. Recently, health technology assessment (HTA) has been introduced in China for negotiating the prices of drugs listed on the National Reimbursement Drug List. For HTA to be optimally adopted to promote the use of better medications at reasonable rates to address developing unmet medical needs, it is crucial to strengthen the process, mechanism, and direction of HTA translation at various levels of authority [38]. Twenty-four percent [$11,171/$46,195] of the annualized cost reductions and 13 percent [$13,963/$107,285] of the total cost savings were attributable to the joint pool. Multistate Pooling Supplemental Rebate Arrangement considerably decreased generic market share but had little effect on preferred market share. The price of brand-name products decreased dramatically, while the price of generics reduced little. Due to tradeoffs, the multistate pool did not affect the daily cost: the increase in the price of preferred pharmaceuticals partially offset the drop in the price of both non-preferred and unlisted drugs. The multistate pool was responsible for 62% [$28,783/$46,195] of the annualized cost reductions and 11% [$11,993/$107,285] of the total cost savings [8].

Volume controls

We found evidence for three interventions that aim to control volumes from 8 studies. Six studies reduce overtreatment, three benefit packages (3 Studies), and cost-sharing (3 studies).

Reduce overtreatment in the first Journal said that pharmacist and physician intervention could reduce medication-related costs. Pharmacists assisting in reducing drugs by adjusting expensive anticancer drugs through a collaborative effort with physicians via outpatient consultations"; however, it indicated a significant overall health economic effect. The total drug cost savings were ¥6984,637, including ¥5842,061 for anticancer drugs, ¥1086,484 for oral drugs other than anticancer, ¥39,388 for premedications, and ¥16,704 for drugs for abuse. The total cost of the added drugs was ¥3224,227, allocated as follows: non-anticancer medicines, ¥1441,317; supportive medicines for adverse drug reactions in chemotherapy, ¥359,127; premedications for chemotherapy, ¥307,961; and anticancer medicines, ¥1115,822 [24]. Pharmacist intervention can make savings (cost containment) of Rp 8,881,440- achieved by using a mix of empiric antibiotics ceftazidime-levofloxacin [18]. The development of clinical pharmacy practice in a hospital outpatient pharmacy will significantly reduce prescription errors and healthcare costs. Unit dose cost of INR 4875.73 and anticipated dose cost of INR 26890.8 were saved from outpatients. Most prescribing errors were associated with therapeutic duplication (43.4%) and drug interaction (25.7%), accounting for anticipated dose cost savings of INR 17812.65 for patients. Major contributory drug classes that reduced the cost of therapy were antibiotics (24.23%), proton-pump inhibitors (13.27%), and analgesics (12.34%). Prescribers' responses to pharmacist intervention varied. 53% responded stopping the drug, 21% responded changing the brand, and 20% changed the frequency of administration [25]. As a global health priority, value-based healthcare is acknowledged. This includes care that is patient-centered, evidence-based, cost-effective, and targeted toward enhancing health outcomes. In addition, value-based care can reduce healthcare expenses by emphasizing the quality of care per service as opposed to the quantity of healthcare encounters. Clearly, value-based health care is advantageous to society, but obtaining optimal, high-quality care poses problems for health systems [39].

The polypharmacy reduction intervention by physicians demonstrates a significant decrease in medication-related costs, and provides training in the core competencies of practice-based learning and improvement and systems-based practice to geriatric medicine fellows in the long term [11]. After the intervention, mean monthly medication costs per resident significantly decreased; overall medications, from $874.27 to $843.56 ($P < .0001$); scheduled medications, from $814.05 to $801.14 ($P ¼ .007$); PRN medications, from $60.22 to $42.43 ($P < .0001$). Gastrointestinal medications demonstrated the highest cost savings of all medication categories (e.g., promethazine and proton pump inhibitors), followed by central nervous systematic medications (including benzodiazepines and fluoxetine), then analgesics, and diabetes medications. This polypharmacy reduction intervention by physicians used readily available tools, demonstrated a significant decrease in medication-related costs, and provided training in the core competencies of practice-based learning and improvement and systems-based practice to geriatric medicine fellows in long-term care [11]. The application of the Clinical Pathway resulted in a total savings of Rp. 1,014,125,684.00 with an average of Rp. 4,899,157,89 per case. It was found that 84% of cases had a length of stay, according to the Clinical Pathway (C.P.). Of these cases, 96% of doctor visits were appropriate,21% use drugs and B.H.P. according to 48% laboratory tests as specified in the C.P. [20]. Another study about reducing overtreatment is the action plan for antibiotic Stewardship targeting antibiotic misuse in public hospitals, reducing prescribing rates to 35.3% and 12.9% in inpatient and Outpatient. Antibiotic intake intensity was decreased to 35.9 DDD/100 bed-days. The average cost of antibiotics for hospitalized patients in outpatient settings fell by $6.95 (se = 1.57; p 0.001) per month during the intervention period. During the intervention period, the average patient costs for medications, antibiotics, and the very-restricted antibiotics significantly dropped by $0.49 (se = 0.12; p 0.001), $0.81 (se = 0.12; p 0.001), and $0.14 (se = 0.02; p 0.001) per month, accordingly [28].

The benefits package defines restricting or reducing the precise care covered by insurance [4]. This strategy has been found ini three research. Members with chronic illnesses received an integrated pharmacy benefit, its saw less growth in medical expenses than those whose coverage included a pharmacy carve-out [9]. By the second and third follow-up years, the integrated benefit group's relative growth in per-member per-month (PMPM) medical spending was significantly lower among

patients with chronic conditions. The overall population sample did not vary substantially in either the level or the growth of PMPM medical expenses. Point estimates imply that the integrated benefit members might have a slower cost rise over time. In another research, preferred lists increased preferred and generic market share and reduced daily costs. Preferred drugs accounted for 62% of total days supply and 54% of total expenditures. Monthly utilization decreased between the pre-policy and post-policy period: prescription claims decreased by 25%, days supply reduced by 23%, and the monthly number of beneficiaries decreased by 37%. The number of products covered by Medicaid has also reduced: the number of generic products fell by 3%, brand products by 57%, and total products decreased by 40% [8]. Managerial interventions such as a limited list of essential drugs, and efficient procurement, through Drugs and Therapeutic Committees (DTCs), have a vital role in improving the day-to-day care of patients and can serve as an effective strategy in curtailing inappropriate drug use, reducing drug expenditures, and increasing availability and accessibility to essential medicines, optimizing the value of limited government funds [26].

A higher level of cost-sharing reduces healthcare costs [4]. In 2013, a 25% cost-sharing level was imposed on 77% of prescribed drugs, up from 53% in 2012. The average cost-sharing burden for pharmaceuticals in 2013 was estimated to be 18%, up from 13.3% in 2012 [32]. The average price per package declined in 2013 by 28%, from €17.8 in 2012 to €12.8 in 2013. Major (>50%) savings were achieved in cardiovascular and nervous system drugs, accounting for almost 60% of total pharmaceutical consumption [32]. The Pay-for-Performance Program reimburses physicians based on their prescribing practices and productivity. If physicians respond to monetary inducements, we anticipate that an incentive program such as the Outpatient Prescription Incentive Program in Korea may influence physicians' prescription practices and, as a result, reduce medication costs. Similar to prior trials, it was insufficient to induce the correct drug use. Although the Pay-for-Performance System, which disincentivizes clinics that overuse antibiotics, could partially reduce antibiotic use, our analysis found that increases in total drug expenditure per prescription were much more significant [15]. In other research, scheme coverage and patient copayments effectively enhanced fiscal sustainability and are estimated to reduce the annual public cost of pharmaceuticals under the community drug schemes by €380 million in 2011 [33]. Even though the share of out-of-pocket copayments went up a lot and reimbursement went down, prices went down simultaneously, so the copayment per milligram of a given drug was often lower than before the act, which was good for the patient [30].

Market-oriented policies

We found three interventions from 11 studies aiming to adjust the market structure to contain costs. Drug waste management was the most (4 studies). Followed the payment reform strategy by (3 studies). Health I.T. was the third rank with two types of research.

Drug waste management, like planning of the stock, drug day, and vial sharing (centralization of compounding + drug day), permitted savings. Potential savings over one year (580,000 USD) reached 13.9% of the cytostatic drugs budget for 2018, and the potential drug waste cost reached 6.1%. The centralization impact is estimated at an average of 79.5%±13.7% waste reduction [27]. It can save up to 11.1 percent of the gross cost of the drug. In another research [22], before the protocol, drug wastage accounted for 8,3% of the Department's annual drug expenditure. Over 70% of these costs were attributable to six drugs (cetuximab, docetaxel, gemcitabine, oxaliplatin, pemetrexed, and trastuzumab) [21]. In 2014, The Centralized Unit for Handling Antineoplastic of National Cancer compared the used drug in drug day to a hypothetical daily preparation saved 16,850 mg (approximately 84 vials of2 00 mg) with an economy of €995,295.8. Similarly, in 2015 we saved 18,245mg (approximately 91 vials of 200 mg) with an economy of €1,077,695.66 [23].

The incentive program is based on two factors: a clinic's prescription volume relative to other clinics and its prescription volume relative to the prior year. The incentive for the clinic is determined by an index that ranges from 20 to 40 percent of the clinic's savings. The corresponding projections following the Extended Incentive Program were K.R.W. 15 and K.R.W. 54 [15].

The Prescription Incentive Program has three effects, the first effect is pharmaceutical expenditures per claim reduced immediately, the second isntibiotic prescribing rate trended downwards and the last effect is immediate reductions in drug prices lowered pharmaceutical expenditures for all diseases, but without permanent impact [13]. Following the implementation of the Outpatient Prescription Incentive, monthly drug expenses decreased. The Extended Incentive Program reduced monthly expenses by 1,8 percent for upper respiratory infections and by 1,4 percent for urinary tract infections. The Outpatient Prescription Incentive Program had few modifications, and its policies had a minimal impact on pharmaceutical expenditures [13].

A larger rise in pharmaceutical expenditures among high-volume clinics suggests that policy initiatives may target high-spending clinics in particular. Some studies have shown that financial incentives influence prescription behavior. Differentiating the incentive formula based on claims volume would optimize the policy's impact by encouraging clinics with greater expenditures to respond more receptively to the incentive [15]. The current free-for-service incentive structure is unsuitable for applying to the INA-CBG's tariff package system. It is necessary to consider changing the incentive structure, which is more cost-conscious considering the large percentage of services in the bill-forming component [20].

Health I.T. is policies designed to promote the use of information technology in health care [4]. Two studies have conducted this strategy. The first research made the initial innovation utilized a digital diabetes preventive program. The digital D.P.P. (diabetes

prevention program) population's total health care expenditure decreased in one year. Fewer hospital admissions and shorter lengths of stay drove cost savings (P 0.001) [12]. The second one included computerized warnings regarding pharmaceutical prices. It helps alter prescribing patterns to suggest a low-cost therapeutic option. Comparing pre to post-application, the application decreased the use of costly medications. The use of metered dose inhalers containing ipratropium hydrofluoroalkane and fluticasone hydrofluoroalkane decreased by 29 percent and 62 percent, respectively (P .001 for both). A 71% decrease in intravenous chlorothiazide was observed (P < .001) computerized medication cost alerts that recommend a lower-cost therapeutic alternative are effective in changing prescribing practices [7].

Conclusion

We collected evidence on cost-containment strategies in pharmacy and included 28 original studies and reviews evaluating 14 different cost-containment strategies. We compared policy evaluations to policies identified in the literature. The existing evidence shows that cost containment strategies vary significantly between policies. We summarised the available evidence, providing a broad overview of the literature on cost-containment strategies. Most research was performed on price limits, followed by reducing overtreatment and drug waste. The drug waste method shown to have the most cost reduction was followed by tendering and reducing overtreatment. Policymakers aiming to contain costs should resort to these policies to maximize their chances of success.

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