

A systematic review of the use of simulated client method in examining medicine price

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Systematic Review

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Abstract

Purpose: This study was aimed to systematically identify and review studies conducted using simulated client/patients that examine medicine selling prices in healthcare settings, including pharmacies, clinics, and hospitals. The quoted drug pricing information, including the dispensing fees and healthcare financing system of the countries involved, were also compared.

Design/methodology/approach: We searched Pubmed, OVID, Scopus, Ebsco (Medline) and ProQuest for papers reporting on simulated patient studies in various medical settings, specifying drug or pharmaceutical pricings. Randomized controlled trials, non-randomized controlled trials, longitudinal studies, cohort or case-control studies, and descriptive studies were included. The quality of included studies was checked using a validated tool.

Findings: A total of 19 papers from 13 countries from all regions of the world were included in this systematic review. Various medical conditions that were presented by the simulated patients, such as cancer, back pain, insomnia and diarrhoea. Information on certain prescription and non-prescription drugs such as buprenorphine, methadone and antibiotics were reported in four studies. Most healthcare facilities adhere to prescribed selling prices, according to the medicine selling price trend examined in this study. Only around half of the research found that medicine prices were higher than the typical selling price. Some countries that practise price control policies were found to have higher drug selling prices than those that do not.

Originality/value: This review, for the first time, revealed that simulated patient method is a practical solution to obtain pharmaceutical price information from healthcare provider and most healthcare facilities adhere to the recommended selling prices.

Introduction

Simulated patients, standardized patients, simulated clients and mystery shoppers are all frequently used research methods to acquire information on healthcare providers' behaviour [1]. For the purposes of this study, the simulated patient (SP) method has been selected as the primary term. This method, which first started as a means of classroom appraisal [2], is now widely applicable in various healthcare related fields, including medicine, nursing, pharmacy, and dentistry [3–6]. It generally involves an individual role-playing as a patient or customer. He or she pays a visit to a medical store, or hospital department depending on the case setting, in order to collect information and to assess the healthcare providers' responses. Many studies employ this method to research the quality of services and evaluate areas for improvement [5, 7, 8]. The main point of conducting an SP study is to observe the healthcare providers in their normal practice. Hence, it is important to keep the role-play covert. The healthcare providers should not know that they are being visited or observed by an SP, although the researchers may have informed them that an SP study will be carried out. Most studies published in developing countries are descriptive, often comparing field survey results with standards of care, or as a step in formulating intervention plans. In addition, simulated customers are being used to evaluate interventions aimed at improving healthcare services [9–11]. SP method benefits over traditional methods for evaluating service efficiency, by its secretive nature which could diminish Hawthorne effect. This could prevent the subjects' behaviour from changing as they do not know that they are being watched.

Many SP studies have been done over the past few years. However, to our knowledge no systematic review has been conducted to study drug pricing. By producing this systematic review, we hope to achieve two main objectives. The first is to systematically identify and review studies conducted using simulated patients that examine drug pricing in pharmacies, clinics, and hospitals. The second objective is to analyse drug prices reported in the included studies in comparison with the national drug pricing control measures including dispensing fee charges.

Methods

The study utilised five databases to search for SP studies: Pubmed, OVID, Scopus, Ebsco (Medline) and ProQuest. A grey literature search was conducted using the Google search engine and Google Scholar. The search terms used are presented in Table 1.

Table 1. Search terms used

Key	General Background	Setting	Medicine cost
Search Terms	Simulated AND (patient OR client OR customer OR buyer OR actor)OR	Pharmacy OR Clinic OR General practitioner OR Hospital OR Dispensary OR Drug store OR Medicine store	Medicine OR Medical OR Drug OR Prescription OR Over-the-counter OR Non?prescription
	Mysterious AND (patient OR client OR customer OR buyer OR actor) OR		AND
	Undercover AND (patient OR client OR customer OR buyer OR actor) OR		Pric* OR Cost*
	Covert AND (patient OR client OR customer OR buyer OR actor)		

The date of the selected articles ranged from the inception of the databases to 21 April 2021. We focused on only healthcare settings because previous literature [12] has indicated that there is vast differences in interaction dynamics of patient-healthcare professional dynamics. One thing to highlight with drug pricing is the drug's dispensed price, i.e. the selling price, which comprises the retail selling price plus any dispensing fees and taxes. We specified the drug price as the dispensed price to better reflect the final cost of a medicine that is usually borne by the patient or the insurance company, or made reimbursable via the country's healthcare system. Suitable articles were closely screened by two reviewers (K.S.L. and Y.W.K.) for eligibility. Where discrepancies arose, they were resolved through discussion, and where there was still a dispute, a third reviewer (Z.A.Z.) took a decision. After conducting the full text screening, the results were compared to identify similarities and contrasts in actual selling price. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method (see Supplementary Information 1: PRISMA Checklist and flow diagram) were used to illustrate the workflow of the systematic review. The data extraction form used to collect result is included in Supplementary Information 2.

Inclusion/exclusion criteria

The inclusion criteria were articles and reports of SP research performed in all healthcare institutions: community pharmacies, clinics, general practitioner, hospitals, dispensaries, drug stores and medicine stores. We only included real healthcare settings, so non-realistic settings such as classroom-based interaction and computer simulation were excluded. The search strategy included human studies of all languages, and all types of trials on patients of all ages. As the term "healthcare providers" is often too general, we defined our subjects as the person in charge of recommending or dispensing drugs. They could be doctors or pharmacists, depending on the setting of study. The types of studies included were randomized controlled trials, non-randomized controlled trials, longitudinal studies, cohort or case-control studies, and descriptive studies. We also include study that examined drug or medication prices. There was no limitation on the year of publication of the studies. We excluded reviews, letters, case studies, conference papers, opinions, reports and editorial papers.

Relevant data that were helpful in the systematic review were extracted into an Excel spreadsheet. After identification of articles, duplicates were removed in the screening stage. Irrelevant content was filtered out by title and abstract screening.

Following the exclusion process, the remaining studies were screened based on the full texts' eligibility.

Quality assessment

The study quality assessment tools of the National Heart, Lung, and Blood Institute of the National Institutes of Health for Quality Assessment of Observational Cohort and Cross-Sectional Studies and Controlled Intervention Studies were used to assess the quality of included studies. One point was scored for fulfilment of the stipulated criteria, and the score groups were assigned based on total points: Good for 10 points and above, Fair for 8-9 points, and Poor for 7 or below. From the quality assessment (see Supplementary Information 3), 10 studies were considered good (53%), eight considered fair (42%), and one study considered poor (5%). The assessments were performed by two reviewers (K.S.L. and Y.W.K.), and disparity in scoring was resolved through discussion to achieve consensus.

Results

The initial search of databases produced 766 results, including a grey literature search in Google or Google Scholar (n = 75). 249 of the results were duplicates. After screening, we selected 19 papers that met the inclusion criteria. The included papers were published between 1993 and 2020. Of the 19, two papers involved solely the use of phone calls to perform SP studies [13, 14]. Only one paper used both methods: simulated patients to visit the medical centres in person and to make phone calls [15]. Both the studies involving solely phone calls had their simulated callers follow scripted dialogues [13, 14]. The rest of the studies that used physical simulated patients trained their SPs accordingly. In total, the 19 included studies were made up of: 16 cross-sectional studies [13–28], one multi-centre cross sectional study [29], one dual-phased mixed method study [30], and one that did not mention its study design [31].

The studies were conducted in 13 countries, namely in Asia (n=7) [16, 18, 19, 26, 27, 29, 31], the Middle East (n=2)[20, 23], Africa (n=3)[13, 25, 30], Europe (n=3) [21, 24, 28], and North America (n=4) [14, 15, 17, 22].

The selected papers referred to SP differently. The terminologies used were: simulated patients (n=9)[15, 16, 18, 20–22, 26, 27, 31], simulated clients (n=6) [13, 19, 23, 25, 28, 29], standardised patients (n=1)[17], pseudo clients (n=1) [30] mystery shoppers (n=1), [24] and secret shoppers (n=1) [14].

Most of the papers performed SP studies in community pharmacies (n=12) [13, 16–21, 23, 28–31] Other medical facilities such as clinics (n=3)[14, 15, 26], and hospitals (n=1)[24] were also reported. One paper involved both clinic and hospital settings [27] and one paper conducted SP methods in all three of these settings [25]

Quality Assessment

Objective and execution

All 19 studies clearly stated the objective of research and their results and conclusions were aligned. Out of the 19 studies, six did not describe the SPs' backgrounds [14, 15, 25-28]. The findings are summarised in Table 2 and 3 for the price and non-price related characteristic, respectively.

Table 2. Comparison of study characteristics reported in the included studies (n=19)

No.	Country	Setting	Post Visit Acknowledgement	SP background	Terminology used	Discrepancies between information obtained from SP and questionnaire
1	Malaysia	Community pharmacy	Yes	Students	Simulated patient	Not specified
2	US	Community pharmacy	Yes	Nurses	Standardized patients	Not specified
3	Malaysia	Community pharmacy	No	Researchers	Simulated patient	Not specified
4	Indonesia	Community pharmacy	Yes	Volunteers	Simulated client	Not specified
5	Pakistan	Community pharmacy	No	Students	Simulated patient	Not specified
6	Germany	Community pharmacy	Yes	Students	Simulated patient	Not specified
7	The Gambia	Community pharmacy	Yes	Medical Research Council (MRC) Laboratories field worker	Simulated client	Not specified
8	US	Orthopedic practice	Yes	Research assistants	Simulated patient	Not specified
9	Qatar	Community pharmacy	Yes	Students	Simulated client	Not specified
10	Denmark	Hospital	Yes	Patients	Mystery shopper	Not specified
11	Kenya	Pharmacies, clinics, government health facilities	Yes	Not specified	Simulated client	Not specified
12	Ethiopia	Community pharmacy	Yes	Pharmacists	Pseudo client	Not specified
13	US	Clinics	No	Not specified	Secret shopper	Not specified
14	US	Clinics	No	Not specified	Simulated patient	Not specified
15	Thailand	Clinics	Yes	Not specified	Simulated patient	Not specified
16	Thailand	Private hospitals and clinics	No	Not specified	Simulated patient	Not specified
17	Turkey	Community pharmacy	Yes	Not specified	Simulated client	Not specified
18	Malaysia	Community pharmacy	Yes	Students	Simulated patient	Not specified
19	China	Community pharmacy	Yes	Research assistants	Simulated client	Not specified

Table 3. Comparison of price related parameters reported in the included studies (n=19)

No.	Drug type/ medical condition	Overview of the scenario	Dispensing fee (USD)	Price control policies	Selling price comparison with the recommended price
1	Common cold	Evaluate advice provision	None	ERP, VAT	Lower by 26%
2	Cancer	Evaluate advice provision	10	Fixed margin	Higher (no statistical data)
3	Back pain	Evaluate advice provision	None	ERP, VAT	Higher (no statistical data)
4	Antibiotics	Purchase medicine to determine quality	1 (prorated)	ERP, VAT	Lower by 34%
5	Insomnia	Evaluate advice provision	None	NA	No significant difference
6	Diarrhea (Loperamide)	Evaluating the quality of medicine dispensed	0.78	Price mark-up	Higher by 127%
7	STD	Evaluate advice provision	None	NA	Lower by 51%
8	Ankle fracture	Compare appointment price and availability of emergency department follow-up orthopedic care	10	Fixed margin	Higher by 30%
9	Acute respiratory condition	Evaluate advice provision	None	NA	No significant difference
10	Lower gastrointestinal diseases, acute orthopedic conditions	Evaluate advice provision	1.63	Price mark-up	No significant difference
11	Acute uncomplicated male urethritis	Assess STI treatment and HIV testing referral practices	None	NA	No significant difference
12	Headache	Evaluate advice provision	None	NA	Higher (no statistical data)
13	Buprenorphine and Methadone	Evaluate advice provision	10	Fixed margin	No significant difference
14	Knee osteoarthritis	Evaluate advice provision	10	Fixed margin	No significant difference
15	Stomach ache	Evaluate advice provision	None	ERP, VAT	Higher by 289%
16	Stomach ache	Evaluate advice provision	None	ERP, VAT	Higher by 777%
17	Diarrhea	Evaluate advice provision	None	Price mark-up	No significant difference
18	Malaysia Regulatory Classification Group B and C medicines	Access selling price of medicines	None	ERP, VAT	Lower by 35%
19	Antibiotics	Evaluate advice provision	None	ERP, VAT	No significant difference

*NA= Not applicable

Randomisation, blinding and follow-up

Of the 19 studies included in this review, none of them reported blinding of exposure or outcome. All of the SPs were revealed to the allocation status of the target medical facilities they were assigned to. No randomisation or follow-up studies were mentioned.

Validity

All of the studies (n=19) standardized their research by using formal scenarios. Written notes (n=12) were widely used to collect information [13, 16-21, 23-25, 28, 29]. Three studies used audiotape and written notes to record [26, 27, 30]. For the simulated phone call method (n=4), the SPs wrote down the responses while engaging in the conversation [14, 15, 22, 31]. To ensure validity, some studies (n=3) provided a questionnaire after the visits to obtain feedback from the medical officer or pharmacy staff [13, 24, 30].

Purpose of SP visits

The main purpose of SP visit is to obtain information on a drug/drugs actual selling price, by emulating a purchase based on medicine type or medical condition. 15 studies were designed based on medical conditions [13, 15-18, 20-28, 30]. Medical conditions included cancer, back pain, insomnia, diarrhoea, sexually transmitted diseases, ankle fractures, acute respiratory conditions, lower gastrointestinal diseases, acute orthopaedic conditions, acute uncomplicated male urethritis, headaches, knee osteoarthritis, and stomach aches. A total of four studies aimed to acquire information on certain prescription and non-prescription drugs such as buprenorphine, methadone, and antibiotics [14, 19, 29, 31].

Number of visits

The number of SP visits to medical facilities made in the included studies ranged from 24 to 371. The two studies that only used simulated phone calls involved 102 calls and 28651 calls, respectively. One study did not mention the number of visits made. The number of visits or sample size was determined by the purpose of visit. Studies that focused on evaluation or statistical analysis should have included a bigger number of observations. To test the quality of a service, for example, more visits would be required to ensure reliability [32].

Simulated patients and training

The number of SPs who participated in each study varied from 1 to 148. For the two simulated phone call-only studies, the number of simulated callers was nine and 102, respectively. Two studies did not state the number of SPs [20, 28]. Many used researchers, research assistants, nurses, pharmacists and fieldworkers who possessed pharmaceutical or medical backgrounds (n=6) [13, 17, 18, 22, 29, 30], and some obtained help from real patients or volunteers (n=2) [19, 24]. Some of the SPs were students in the medical field (n=5) [16, 20, 21, 23, 31] Most of the SPs were trained before actually visiting the medical facilities, except for the one study that used patients as SPs [24]. Scripts and scenarios were prepared before the real visits were carried out.

Ethics and consent

Among the 19 studies, only 14 stated that researchers obtained consent and ethical approval prior to the visits or calls [13, 16, 17, 19, 21-26, 28-31]. The remaining 5 studies did not provide information about ethical approval [14, 15, 18, 20, 27].

Selling price of drugs

All of the studies collected information on medicine prices. When compared with the recommended price, 37% (n=7) of the studies indicated that the prices of drugs recommended by the medical staff in some pharmacies or clinics were higher than

the standard prices [17, 18, 21, 22, 26, 30]. Eight studies provided feedback that the costs of drugs across different pharmacies did not show significant differences [14, 15, 20, 23-25, 28, 29]. Four studies reported lower selling prices than the recommended prices from pharmaceutical authorities [13, 16, 19, 31].

Dispensing Fees

We also collected information on dispensing fees, which are professional fees charged by pharmacists whenever a prescription is filled [33]. The purpose of charging this fee is to compensate for the consultation given by the pharmacist. As it is difficult to quantify the extent of service, not every country applies a dispensing fee. In this review, only 4 countries, which appeared in 7 studies, have dispensing fees in their pharmaceutical system [14, 15, 17, 19, 21, 22, 24]: Denmark, Germany, Indonesia and the US. In 2021, this dispensing fee ranges from United States Dollar (USD) 0.78 to USD 10, with the lowest fee in Germany and the highest in the US.

Discussion

SP method is a practical way to obtain the actual selling price of drugs. Majority of the healthcare facilities were selling medicines which actual selling price is similar to the recommended selling prices. By conducting visits to community pharmacies, clinics and hospitals, or by making simulated phone calls, SPs are able to get price information and quotations. In some countries where medicine pricing is regulated by government authorities, SP visits could help reveal the current situation of the drug market and how the market is reacting to certain pricing policies [34] This is because the sellers might be reluctant to disclose the selling price as their competitors would use this to their advantage to adjust their own pricing [31]. Therefore, the SP method would be useful to conduct pricing surveys rather than indirect methods such as data collection forms.

Drug pricing policies

Most countries are implementing pharmaceutical pricing policies to regulate drug prices. There are five commonly used policies: regulation of mark-ups, regulation of distribution chains, external / international reference pricing (ERP), increased usage of generics, and tariff / tax exemptions. In Asia Pacific countries like China, Indonesia, Malaysia and Thailand, the government allows free pricing on drugs. This free pricing policy has led to the occurrence of pharmaceutical price variance among GP clinics and private hospitals. However, price negotiations are permissible. To avoid sky-high drug pricing, these countries apply ERP as a guide to suppliers and retailers. Value-added taxes are also charged on drugs. From a survey by World Health Organisation (WHO [35], China taxes the heaviest (17%), followed by Indonesia (10%), Thailand (7%) and Malaysia (6%).

Developed countries like Denmark, Germany and Turkey control drug pricing via mark-up policies. A mark-up is the sum of all the additional charges and costs imposed on a product so that the seller can profit [36]. A ceiling is imposed so that there is a mark-up limit. With price regulation, patients are able to afford medications that in most cases are extremely important to keep them healthy.

In the United States, around 30% of patients are unable to afford their prescriptions, and later succumb to illness. Unlike other countries, the United States government does not directly monitor or negotiate drug prices. Instead, pharmaceutical companies are allowed to set their own prices, but insurance companies and pharmacies will determine the actual costs that patients pay by abiding to a fixed margin. Since 2010, the government has offered discounts and rebates to pharmaceutical companies. This can reduce production costs by about 18% each year. From 2010 to 2014, the discount amount increased to 24% of the total cost of the original brand drug. In addition, in order to increase the transparency of hospital prices, federal regulations require all hospitals to publish medical procedures online and update the list at least once a year [37].

In Ethiopia, Kenya, Pakistan, Qatar, and the Gambia, it has been shown that the buyers, i.e. patients, do not possess sufficient knowledge of drugs [38]. For example, the seller sells a medicine to patient A at one price while to patient B at another.

Buyers sometimes pay more than everybody else since they do not know how much others are paying. Also, there is a lack of transparency in drug markets in these countries. Some products are already monopolised by a single supplier, hence the selling price could be adjusted to gain more profit.

Dispensing fees are charged in some countries. In the United States, a small amount is automatically deducted from the patient's account to issue e-prescriptions [39]. In Germany, the dispensing fee is part of the insurance premium. If the medicine you buy is not covered by insurance, you have to pay more [33]. The introduction of Indonesia's national health policy, universal health coverage, has provided pharmacists with the opportunity to become a major player in primary healthcare. Pharmacies that participate in the universal health coverage scheme are allowed to reimburse dispensing fees based on a coefficient per different drug price [40]. When selling prescription drugs or over-the-counter drugs sold with prescription drugs, pharmacists in Denmark charge a dispensing fee. This fee is per item, with the price of a drug determined by the Pharmacies Act.

Difference between actual selling price and recommended selling price

Six studies from four different countries reported higher selling prices while adhering to price control policies. Local pharmacies rarely receive prescriptions from GPs, so they tend to recommend other medications (not generics) to increase their income. Generic drugs are about 20% to 80% cheaper than branded drugs, so patients tend to buy them more frequently. In Malaysia, pharmacists tend to recommend medications that are priced much higher than generics. For example, 21% of pharmacists would recommend diclofenac and specifically Voltaren as the medication for the treatment of back pain, even though Voltaren is more expensive than generics [31].

On the other hand, GPs charge based on the time spent for treatment and might even offer a physical examination to subsidize other aspects of care. In the symptom-based case, a much more expensive drug is usually dispensed unless the patient asks for a specific brand. Quotations for uninsured versus insured patients were found to have a big price difference too, as GPs and hospitals want to make sure they would make a profit rather than giving free treatment [17]. As long as the quotation or selling price is not significantly overpriced, sellers try to sell at as high a price as possible while maintaining the price control margin.

In Thailand, private clinics include the consultation fee in the fee paid for the drugs (USD 5.50). The total cost to the patient is mainly made up of the recommended additional technical examinations. The charges for suggested examinations were highest in private hospitals (average USD 37.70), and lowest in family practices in health centres (average USD 3.20). Private clinics in Thailand would mostly likely charge the cost of medication along with a consultation fee. Additional pharmaceutical costs would come from recommended technical examinations, which is a way to earn extra profit from the patients. A study by Pongsupap and Van Lerberghe [26] revealed that the cost of a proposed technical examination is highest in private hospitals (average USD 37.70) and lowest in GP clinics (average USD 3.20).

With price control policy implementation, eight studies from six countries reported equal or lower selling prices than recommended selling prices. Most of these were presented based on medical condition scenarios, including insomnia, diarrhoea, osteoarthritis and flu. The medication dispensed is mostly lower priced generics and OTC drugs. Pharmacists tend to offer generic antibiotics as they are less expensive than branded ones. They keep the cost of treatment low, as common flu often requires less regimen and follow-ups. In Malaysia, some community pharmacies even set the actual selling prices of innovator prescription drugs 35% lower than the selling price recommended by the Malaysia Pharmaceutical Service Division [16]. This is a strategy to attract new customers and maintain good business.

In countries that have no price control policies in place, we can only observe a higher price trend in one study. The other studies showed similar or lower selling prices when compared to the recommended selling price. This trend might be due to local pharmacies only offering short-term treatment and not a complete treatment plan. Pharmacies function as a source of fast and cheap medicine.

SP studies in different countries and settings

In this systematic review, studies from 13 countries were included: China, Denmark, Ethiopia, Germany, Indonesia, Kenya, Malaysia, Pakistan, Qatar, Thailand, the Gambia, Turkey, and the United States [41]. Countries such as China (n=21), Denmark (n=7), Germany (n=80) and Pakistan (n=10) have fewer simulated visit publications compared with other countries even though they generally have larger population sizes. Similarly, African countries' utilisation of the SP method is targeted at surveying the local drug market. As developing countries like Ethiopia, Kenya and the Gambia are prone to life-threatening diseases, biomedical services and drug distribution are critical to ensure that people are protected. However, Ethiopia is constantly challenged by issues of equitable distribution and the safe use of pharmaceuticals.

Specific problems include the promotion and marketing practices of multinational corporations, and the use of drugs by retailers, healthcare professionals, and patients. Part of the reason is that governments in many countries are unable to implement World Health Organization guidelines, which means a basic (or appropriate) low price, due to promotional activities, multinational patents, and complex pricing systems. It is not possible to formulate a rational drug policy aimed at purchasing a priced product.

As there are no proper drug policies in these countries, doctors tend to overprescribe, and at the retail level, pharmacy staff and unqualified drug distributors take advantage of the less informed public and sell them non-prescribed, questionable-quality drugs which, in most cases, are harmful to health [42]. By performing SP studies, researchers hope to evaluate this situation and translate it into written form so that the authorities can pay more attention to the dire pharmaceutical conditions. The number of SP publications in 2020 in Ethiopia, Kenya and the Gambia was 4, 91 and 1, respectively.

For Indonesia, Malaysia, Qatar, Thailand, Turkey and the United States, SP research carried similar objectives: to record from practical exercises and obtain data which otherwise would be a challenge to get. The SP method could assess healthcare providers' behaviour and professionalism when giving treatment or dispensing drugs. The method could also determine whether there is bias during the treatment. Cumulatively, these countries produced most of the SP publications in 2020: Indonesia (n=3), Malaysia (n=11), Qatar (n=4), Thailand (n=6), Turkey (n=25), and the United States (n=1301).

SP in subgroups: face-to-face and remote methods

While typical SP study designs are face-to-face visits, some SP methods take on a different approach: simulated phone calls. Both ways are scripted and the SPs are often trained. In this systematic review, a total of 3 studies involved simulated phone calls to target pharmacies and hospitals. This remote method offers better control of the simulation as the SPs can follow the scripts and respond accordingly. Otherwise, SPs have to memorise key points before actually visiting the subjects physically. The downside is that there is no way to observe the emotion of the healthcare providers during the survey. Staging a phone call could also restrict the chance of engaging in conversation as the targets might refuse to disclose important information such as drug pricing over the phone, and will only do so when the caller visits the store. Thus, the majority of the SP publications aiming to obtain pharmaceutical or medical information decided to use physical SP visits instead of using simulated callers.

Limitation

This study is restricted due to several limitations. Firstly, the SP studies were taken using two different scenarios: drug-based and condition-based. It would be better if the systematic review were focused on a single scenario for clearer comparison. Since we collected studies from different scenarios, the results are difficult to interpret as the settings vary. We did not include non-healthcare institutions as this review focused on the medicine pricing at mainstream healthcare institutions, which are pharmacies, clinics, and hospitals. We attempted to examine the behaviour component of healthcare professionals but since only 6 out of the 19 included studies mentioned this very briefly, it was removed from the aims of this review. Of note, all 6 papers reported unsatisfactory responses from the tested healthcare professionals.

Conclusion

The drug selling price trend that was analysed in this study shows that most healthcare facilities adhere to recommended selling prices. Less than half of the studies have shown that the prices of drugs sold were higher than the standard selling price. When that was the case, the prices ranged from 30–777% higher. Some countries that practise price control policies were found to have higher drug selling prices than those that do not. To counter this unhealthy situation, health authorities should be stricter in the provision of pharmaceutical pricing.

Recommendation

Healthcare providers can take this study as a reference when they are deciding on the drug selling price. This study might help to draft a comprehensive sales plan while adhering to the drug price ceiling. On the other hand, this study can be used as a guide for healthcare providers to educate the public on drug pricings.

Abbreviations

Simulated patient

SP

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PRISMA

External / international reference pricing

ERP

World Health Organisation

WHO

United States Dollar

USD

Declarations

Competing interests: The authors declare no competing interests.

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Figures

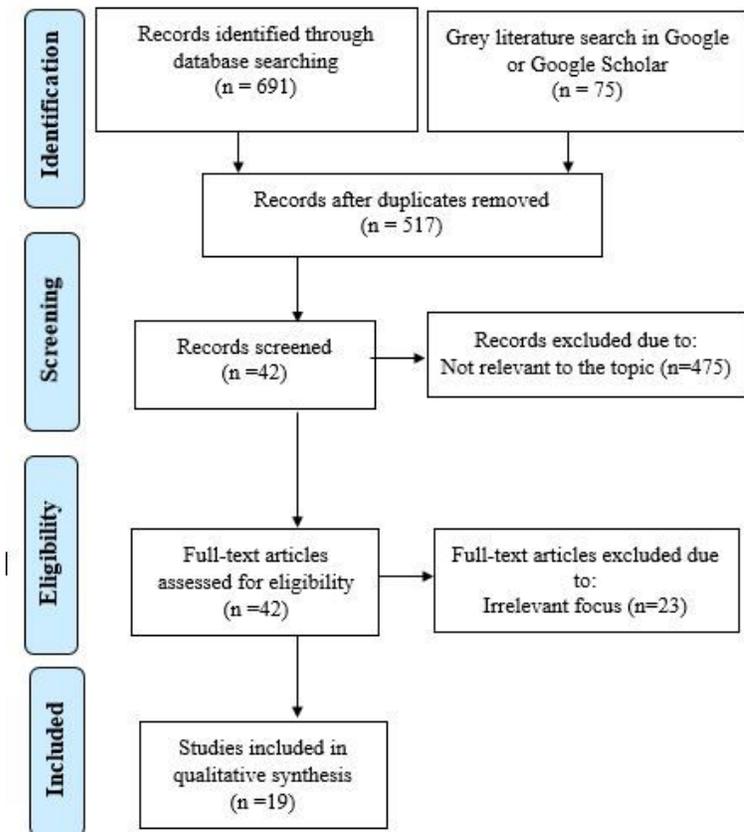


Figure 1

PRISMA diagram demonstrating the search strategy and its results.

Supplementary Files

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- [SupplInformation1PRISMAtableandFlowchart.doc](#)
- [SupplInformation2DataExtractionForm.docx](#)
- [SupplInformation3QualityAssessment.xlsx](#)