

Chapter – 2
Review of Literature

Review of Literature

2.0 Introduction

The chapter details review of various research papers, articles and books relevant to this research providing an insight into the issues related to generic medicines with the studies conducted in the world including India covering perspectives of doctors, pharmacies, patients, chemists, government policy, regulation. The research gaps were identified which helped in narrow down the focus in further conduct of the study with a focus on knowledge, attitude and practice of medical practitioners towards generic drugs.

2.1 Scope of review

It was an attempt to undertake research in the space of prescription of generic drugs in India. Articles, books and journals were referred.

Keywords: generic medicines, generic drugs, brands, knowledge, attitude, practice, prescription, consumers, patients, doctors, prescribers, pharmacists, chemists, dispensation, issues, government policy

2.2 Methods

A literature search was conducted with an aim to identify published studies on generic drugs connected with knowledge, attitude, practice of consumers, doctors, chemists on generic medicines. The strategy adopted for the search was application of Boolean Operators for combination of the terms such as brands, generics, medicines, drugs; consumers, doctors, prescribers, patients, chemists, pharmacists; prescription,

dispensation, issues, government policy. The search was restricted to studies published from January 2005 to July 2022. Electronic databases searched included World Wide Web, Google Scholar, SAGE, JSTOR, DOAJ, EMERALD, EBSCO among others. The identified articles were arranged chronologically.

2.3 Narrative review of studies

Studies including relevant articles in the media found to be relevant were included in the review of literature. Below is a narrative review of the studies that was done. A summary of research papers is given in Table 2.1

2.3.1 2005 Brazil - Awareness of Generic Drugs & its Use

In the perspective of developing nations, in a study conducted in Brazil where medicines account 37.0% of household expenditure on health, the authors estimated 3.9% share of generics to total medicines. 86% of population knew generic drugs are inexpensive and 70% recognized quality is comparable to branded drugs, however, only 57% recognized packaging appearances that differentiates generic drugs from brands (Bertoldi et al., 2005). People having higher income choose to buy branded medicines. Medical prescription and price are the most vital factors in selecting medicines as concluded by the authors, a majority of patients bought exactly what was prescribed.

2.3.2 2007 Finland - Generic Substitution, Customers' & Physicians' Opinions and Experiences

In a study related to generic substitution, customers' and physicians' views and practices were evaluated (Heikkila et al., 2007). It was found that doctors had knowledge that generics can be interchangeable with innovators, but about half of

them held views that interchangeable medicines are not as safe and effective as branded medications. The primary reason for generic substitution is to save money, and it is generally considered a good reform measure. The main reason patients refused substitution was their positive experiences with previously used medications. Wider acceptability of generics by customers is also vital of its increased usage.

2.3.3 2008 Japan - Generic Drugs Knowledge Among Patients and Healthcare Professionals

In a study to assess knowledge of generic medicines among patients and healthcare professionals conducted in Japan (Hoshi & Kimura, 2008), it was concluded that along with the promotion of generic drugs in the media, pharmacists and medical practitioners must endorse use of generic drugs to increase its acceptance among patients. One reason for non-use of generic drugs by patients is due to recommending branded medicines by doctors.

2.3.4 2008 Malaysia - Consumers' Perceptions & Awareness of Generic Medicines

In a pilot study on perception & awareness of consumers in Malaysia (Nabil et al., 2008), only 28.3% of the respondents could relate with the term generic medicines, 70% had no awareness that generic drugs can be marketed by pharmaceutical companies in different names, 34% stated pharmacists gave information regarding generics, 32% felt branded medicines cause less side effects than generics, 64% had awareness that branded medicines cost more compared to generic alternatives. The survey revealed gap in awareness and understanding of consumers towards generic drugs. Physicians and pharmacists, along with activities aimed at educating patients,

need to promote & recommend generic medicines more often. Research suggests that the majority of patients' decision to take generic medicines is based on learning about generic medicines from healthcare professionals.

2.3.5 2009 Global - Consumers' Opinions of Generics

A narrative review of twenty identified studies (eighteen in developed economies, only two in developing economies excluding India) on perception of consumers towards generic medicines was conducted globally from 1970 to 2008 (Hassali et al., 2009). In general, mixed reactions were seen by the consumers which was due to divergence of views because of several factors such as country development level, consumers' socioeconomic background, medicine reimbursement scheme, government policy, relations with doctors, experience with medicines in the past, and severity of illness. Increase in display of knowledge and confidence towards generic drugs has been observed over the years, especially in developed countries. Education of the public, monetary incentives, and a greater communication between healthcare professionals and patients were identified as interventions contributing to the increase in generic medicine usage. Further studies mostly in developing countries including the decision making processes for generic medications were needed where savings in cost are required more than in developed nations.

2.3.6 2010 Malaysia - Generic Medicines Use, General Practitioners' Knowledge & Opinions

In a study conducted to assess general practitioners'(GPs) awareness and opinions of generic drugs in Malaysia (Chua et al., 2010), it was found 85.1% of GPs claimed

active prescribing of generic medicines, however, less than 5% could correctly identify bioequivalence standard for generic medicines and respondents in majority believed generic drugs in dosage are equivalent to the branded medicines. However, there were misconceptions with regards to generic medicines among the respondents in areas such as bioequivalence, effectiveness, safety, and standards in manufacturing. GPs believed that a host of approaches are required such as issue of standard guidelines for substitution of brand, to work together with pharmacists, education to patients besides evidence of efficacy and safety of generic drugs were essential to get increased acceptance of generic medicines. Further, product promotions by way of mass media and promotional incentives given by pharmaceutical companies, patients' socio-economic status and manufacturers' reputation were factors that may sway choice of medicine.

2.3.7 2010 New Zealand - Consumers' Awareness, Opinions & Attitudes

In a study conducted in New Zealand to evaluate awareness, perception and attitudes of consumers towards generics (Babar et al., 2010) it was found that 51.6% of the respondents had awareness of generic medicines which is attributed to pharmacists who being the leading source of information followed by medical practitioners and media. A direct relationship was seen between higher level of education and correct knowledge of generics. Knowledge of generics determined participants' attitude towards the practice of generic drugs. Participants (79%) were willing to substitute branded medicine with a generic for a minor illness. Participants with enhanced knowledge were willing to change to generic medicines for a major illness. Previous positive experience also determined their willingness to use generics. The main

indicators to increase use of generics were the advice of medical practitioners and pharmacists along with having knowledge about generic medicines.

2.3.8 2011 Iraq - Consumer Perception about Generic Medicines

Education by doctors and chemists appear to be the best method to promote generic drugs to consumers. The study found several barriers to recommending generic drugs in Iraq, including unwillingness of doctors to prescribe generic drugs, confusion over different brands, and fake medications (Sharrad & Hassali, 2011). Majority of the participants conveyed acceptance of generic substitution with the doctor's approval whereas a few would accept on recommendation of chemists. To overcome gap in knowledge of consumers in Iraq, the study concluded that the education about the benefits of generic medicines is a need to overcome gap in knowledge of consumers.

2.3.9 2011 India - Price and Quality Comparison between Branded and Branded Generic Medicines

With an aim to build confidence among consumers, pharmacists and doctors, the government must promote awareness on quality of generics. In a study on price and quality of medicines to assess the generic and the equivalent brand, it was found unexpectedly that price difference to patient was not high but profit margins to chemists were excessive for branded generics. The highlights of the study are focused on the need to change policy on drug pricing, control mark-ups, conduct tests and extensively advertise quality of generics (Singal et al., 2011).

2.3.10 2011 India - Perceived Generic Drugs Quality by Doctors and Brand Equity

According to a study conducted in India (Sanyal & Datta, 2011) to determine whether generic medicine quality correlates with brand equity of branded drugs and to examine doctors' opinions regarding generic drugs for selected indications. Using internal (product information) and external (price, product name, country of origin, retailer reputation, advertising level) mediating variables, the judged quality of branded drugs influences brand equity. Additionally, doctors' experiences with quality of medicines used lead them to expect quality from substitute products.

2.3.11 2012 Turkey - Pharmacists', Doctors' & Patients' Knowledge & Attitudes

In a study held in Turkey (Toklu et al., 2012) to assess awareness and attitudes towards generic medicines, it was found that patients, pharmacists and doctors have inadequate knowledge about generic drugs. No association was seen between acceptance of generic drugs and demographics (excluding education) such as age, gender, and income. However, inverse association was found between acceptance of generic drugs and education level, i.e., acceptance of generic substitution is unlikely with highly educated patients.

2.3.12 2012 - Savings from Switch from Innovators' Brand to Generic Equivalents

Affordable access to treatment is the main reason to make generic medicines popular by the government. For a long time, generic medicines have been recognized as contributing to reduction in healthcare expenses. Multiple studies have established that

savings in the range 9 to 89% can be realized in developing countries by way of substituting originators' brand by low-priced generic medicines (Cameron et al., 2012).

2.3.13 2012 Italy - Pediatricians' Opinions & Patterns with Generic Drugs

In a study conducted in Italy (Fabiano et al., 2012) to gather information concerning family pediatricians' opinions of generic drugs and its prescribing, it was found that only 37.2% of respondents had sufficient knowledge and 32.6% had good knowledge of generic drugs. One of the reasons hindering prescribing of medicines in generic names was the insufficient knowledge of generic medicines.

2.3.14 2013 India - Doctor-Manufacturer Relationships in Pharma

The fostering of close relationship between doctors and pharma companies managed through MRs has been known the world over which works both ways – companies assisting doctors increase in their knowledge of company's product and doctors giving feedback to companies to develop new and more effective medicines. Such collaboration benefits patients and society through improved healthcare. Close relationships between doctors & medical representatives and rewards to doctors influence doctors' prescriptions according to a study on customer loyalty (Bachheti & Saklani, 2013).

2.3.15 2014 Global - Patient Awareness, Opinions and Acceptance of Generic Drugs

In another study on literature review of fifty-three studies for the period 1990 – 2013 from Europe (twenty-four), North America (ten), Asia (six), Australia & New Zealand

(five), Middle-East (five), and one each from Africa, Latin America, and the Caribbean region showed that patients are unlikely to favor generics over branded medicines. Insufficient knowledge about unbranded medicines is common amongst larger proportion of patients and customers in many countries. Thus, patients need to be educated about unbranded medicines. The literature review also shows that in the recommendation of generic medicines and generic substitution, doctors and pharmacists have an important role to play in educating patients (Alrasheedy et al., 2014).

2.3.16 2014 Malaysia - Educational Intervention for Improving Doctors' Awareness and Perceptions

In a study conducted in Malaysia to assess influence of the educational intervention on medical practitioners' awareness and perceptions towards generic drugs (Hassali et al., 2014), it was found that prior to educational intervention doctors held insufficient knowledge and misunderstanding about generic drugs. Educational intervention did improve knowledge on bioequivalence, equivalent generic medicines and required standards for safety for registration of generic medicines. However, no significant change in perception was observed and also there was no impact in prescribing of generic medicines.

2.3.17 2014 India - Doctors' Awareness and Opinions

In a study to assess awareness and attitudes of doctors towards bringing down the cost of medicines (Billa et al., 2014), it was found that high proportion of government doctors (GDs) and private doctors (PDs) at 97% and 72% respectively are concerned

with high cost of medicines. GDs and PDs at 80% stated that more than cost, safety and efficacy were more important. A majority of GDs (71%) and PDs (65%) knew about the various methods in bringing down the cost. Drugs were graded according to cost by 24% of GDs and 65% of PDs. High proportion of GDs (94%) and PDs (73%) stated that life-saving drugs should not be covered under patent protection. Stepwise introduction of generic medicines by 64% of GDs and 10% of PDs and the use of generics by 20% of GDs and 10% of PDs was stated. Limited therapeutic index (43.5%) and fear of substandard quality (38.5%) are the factors restricting use of generics.

2.3.18 2015 Global - Generic Medication - Perceptions in Population, Medical Practitioners, Pharmacists

Negative perceptions about generic medicines compared with their branded equivalents are being held by a majority of medical practitioners, pharmacists and lay people who perceive generic medicines low in quality, hence less safe and less effective. Probably such attitudes serve as barriers to the extensive use of generic drugs. A review of observational studies based on fifty-two articles on perception of generic medicines amongst population, physicians and pharmacists was conducted (Colgan et al., 2015). The publication included data from twenty-seven countries from 1987 to 2015. On effectiveness, a majority of general population 35.59% believed generic drugs were not as effective as branded equivalents compared to doctors (28.68%) and pharmacists (23.60%). On quality, minimum 25% from each group (pharmacist 33.39%, physicians 28.04%, general population (25.11%) believe generic medicines are not at par on quality of branded medicines. On side effects of generics,

doctors believed generics caused more side effects (24.43%), pharmacists (17.56%) and lay people (18.76%). On safety, a higher number of doctors (28.54%), pharmacists (21.44%) and general population (17.97%) perceived generic medicines less safe compared with branded medicines. People without professional or specialized knowledge (34.03%) felt negatively about branded drug's substitution with generics compared to medical practitioners (24.11%) and chemists (11.04%). It is likely these attitudes towards generic medicines amongst medical practitioners act as barriers to wider use of generics.

2.3.19 2015 India – Prescribers' View

In a study conducted at a medical institute in Central India, it was found that 98.4% of the participants comprising of junior residents, interns, senior residents and academicians had a good knowledge about generic drugs, however, it was not reflected in their prescriptions of medicines in generic names thus revealing a cliff between knowledge, attitude and practice (Badwaik et al., 2015)

2.3.20 2015 India - Generic Medicines - Doctors' Knowledge, Attitude and Practice

In a study conducted in South India at a tertiary care hospital (Gupta et al., 2015), it was found that good percentage of doctors had knowledge about generic drugs and displayed good attitude towards quality, efficacy and safety of generics. Majority of the doctors (63%) agree to prescribing medicines in generic names, however, a significant percentage expressed concerns about efficacy & safety of generic medicines which shows a hurdle to wider generic drug use.

2.3.21 2016 India - Beliefs and Attitudes of Generic vs Original Drugs

Training programs for healthcare providers may be essential to bridge the gap between knowledge and prescription practices of generic medicines was the conclusion drawn in a study (Singh et al. 2016).

2.3.22 2017 India - Resident Doctors' Knowledge, Attitude & Practice of generic medicines

Concerns amongst resident doctors about effectiveness, safety and availability of generic drugs are the key for choosing branded medicines. According to a study conducted at a tertiary care hospital engaged in teaching in West India (Kamejaliya et al., 2017), it was found that the majority of doctors were of the view that generic drugs are cheap because of inferior quality (71.9%), have uncertain effectiveness in serious diseases (44.6%), can be recommended in all diseases (61.9%) and mandatory prescribing generic medicines (37%). Brands were preferred over generic medicines by doctors due to reasons such as concern about efficacy (100%), concern about safety (61.57%), poor availability of generic medicines (57.85%), inadequate availability of information (33.06%). Most respondents disagree with generic substitution of prescribed branded medicine by pharmacist for the reasons such as unsure about quality, efficacy and safety of generic drugs.

2.3.23 2017 India - Possible Issues, Impacts & Consequences with Generic Medicines Prescription

The generic drug can considerably bring down the cost involved in the treatment but without compromising efficacy and safety. The generic drug must prove to be

bioequivalent with their branded counterparts. The possible and immediate effect of this decision will be that the unethical or commission-based prescription by doctors will be hampered (Chaturvedi, 2017).

2.3.24 2017 Brazil - Factors Influencing Purchase of Generic Drugs

In a study conducted in Brazil (Guttier et al., 2017), it was found that 88.1% of the participants had awareness that generic medicines were inexpensive than reference medicines, 69.8% held the view of an equivalent quality and 76.6% correctly identified the packaging difference between generic drugs from other drugs. Direct positive relationship was seen between knowledge and preference for buying generic drugs. Participants (77.7%) showed preference for buying generic drugs due to good knowledge about them compared with 18.4% who had insufficient knowledge. Therefore, knowledge is associated with the preference for purchase of generic medicines by the population, people with higher knowledge show greater preference to buy them. Therefore, educational promotions for medical practitioners and population seem to be the best way going forward for increasing acceptance of generic medicines.

2.3.25 2018 India - Doctors' Awareness of Generic Drugs

In a study to explore doctors' perceptions and understanding (knowledge, attitude and practice) about generic medicines at a tertiary care hospital in North India (Gupta et al., 2018), it was concluded that 62.9% doctors consented with intended interchangeable of branded medicine with generic alternative. 77.5% of doctors had awareness on conduct of bioequivalence studies of generic medicine along with the

branded counterparts. 88.8% of the doctors agreed to teaching the significance of generic medicines in initial stage of internship. 80.9% doctors thought that by switching a brand-name medicine to an equivalent generic, outcome of treatment may remain unchanged. To address the concerns of a portion of respondents with an aim to increase awareness and acceptability of generic alternatives, further focused efforts on interventions for doctors and public is required.

2.3.26 2018 India - Quality Perceptions of Generic Medicines

Patients', doctors' and pharmacists' perceptions mostly favored branded medicines despite comparable quality of branded medicines and their generic alternatives found in testing. In the private sector, negative perceptions of generic drugs and doctor-directed promotional activities by pharma companies lead to the choice of expensive branded drugs (Aivalli et al., 2018).

2.3.27 2018 India - Patient Perception about Generic vs Branded Medicines

Doctors prefer branded medicines over generic medicines. In a study (Tripathi & Bhattacharya, 2018) undertaken to assess experience and views of patients who were using generic medicines bought from Jan Aushadhi kendras (generic drug stores) in a tertiary care hospital in Northern India, it was found 72% of the respondents had heard of generic drugs and 65% could differentiate branded and generic medicines. Despite 67% consented that branded medicines are expensive, only 35% of them were willing to buy generic alternatives as 61% of them held the view that generic drugs are of low quality in comparison to branded medicines. Majority of the patients neither asked doctor (64%) nor pharmacist (59%) to recommend or dispense generic drugs.

According to patients (45%), branded medicines were preferred over generic drugs by doctors. The factors that hinder widespread acceptance in prescribing and dispensation of generic drugs is due to the limited availability, inadequate awareness and patients' attitude concerning quality of generic drugs.

2.3.28 India 2018 - Prescribing Generics

In an article 'Prescribing generics: All in a name' (Roy & Rana, 2018), it was highlighted the lack of confidence in physicians and patients on the quality of generics is a major reason for prescribing branded medicines. A further escalation of the problem is caused by pharmaceutical companies promoting branded generic medicines aggressively. The lack of compliance by pharmaceutical companies with Good Manufacturing Practices (GMP) is a major concern concerning generic drugs' effectiveness and safety.

2.3.29 2018 - Drug Information on Generic Medicines & FDA Questions

The commonly understood terms "generic drug" or "generic medicine" meaning a pharmaceutical product which does not require an authorization from an innovator company to manufacture and is marketed after the patent has expired. Generic medicines are usually interchangeable with an original product of an innovator (FDA, 2018; WHO, 2021). The generic medicine is meant to do the same thing as the originator drug but is much cheaper than the branded medicines. The expensive clinical trials are not required to be carried out by the manufacturers of generic medicines because of which they can afford to sell medicines at low prices.

2.3.30 2018 Sierra Leone - Awareness and Opinion of Generic Medicines

In a study conducted at Sierra Leone (James et al., 2018) to explore awareness and opinion of generic drugs among final year students of undergraduate programs such as medical, pharmacy and nursing, it was found 3.2 % of the participants had information on acceptable bioequivalence limit. Minimum half of the respondents in each of the group agreed the therapeutically equivalence of generics to innovators' product. Medical (50%), nursing (66.6%) and pharmacy (45.5%) believed that innovators' products are required to comply with higher safety standards over generic alternatives. A great majority at 95.2% agreed need of additional information on quality, efficacy and safety of generics. Deficient knowledge and misconception towards generic medicines were observed which can be overcome by providing training surrounding generic drugs.

2.3.31 2019 India - Willingness to Prescribe Generic Drugs

In the FMCG sector, the inclination to buy reflects likely demand for a particular product/brand, however, in the pharmaceutical sector, the likely demand for the medicines is determined by the doctors' inclination to prescribe. The doctor's prescription is an important determinant in building the sales of a particular brand which is largely driven by the marketing promotional efforts of the pharma companies through the regular visits by the MRs. In a study to evaluate willingness to prescribe generic drugs (Shetti & Khanna, 2019) it is revealed that majority of the doctors who are presently recommending generic medicines to few patients are interested to recommend to more number of patients. The preference of doctors to prescribe generic

drugs to patients ranged from poor or below the poverty line, middle-class, elderly or retired and working class in that order.

2.3.32 2019 USA - Generic Drugs Not as Safe

Generic medicines are an important constituent in making healthcare affordable. Generics have been a success in USA (White et al., 2019). Overall, generics account for 90% of volume of prescribed medications in the USA but are valued at 26% of drug spending resulting in savings of \$1.7 trillion in the past decade. There has been a shift in manufacturing, approx. 80% of APIs and 40% of finished dosage forms has moved out of USA. USA FDA approved 781 new generics in 2018 setting a new record; has strict regulations in complying with delivery of medicines in blood concentrations at par with brand name medicines. However, it has been observed that there are gaps in adherence to GMP by companies indicating falsification, adjustment or non-disclosure of data from the FDA. Instances point to companies in India, China & Italy.

2.3.33 2020 India - Effect of Marketing Promotional Strategies

In a study to evaluate influence of marketing promotional strategies adopted by pharma companies on prescription behavior of medical practitioners (Narayan et al., 2020), pharmaceutical companies heavily rely on doctors to prescribe medication; doctors make the decision not patients. Drug sales are therefore driven by pharmaceutical companies' efforts to influence doctors. Around 62% of medical practitioners acknowledge having been influenced by promotional activities of drug

manufacturers. However, socioeconomic status of patient remains an important factor in recommending medications irrespective of promotional activities.

2.3.34 2020 India - Medical Professionals & Pharmacists - Opinions Towards Generic & Branded Drugs

In a study that examined the opinion of medical practitioners and pharmacists about medicines in generic and brand name (Dhale et al., 2020), it was found that 59% perceived the effectiveness of generic drugs at par with original drugs, however, 23% believed that generics were ineffective based on their experienced difference in quality between the generics and original drugs. A gap has been identified between the knowledge and generic perspective on new drugs. Less than 2/3 of respondents (64%) agreed with the safety of generics as with innovators' medicine. Less than half (46%) agreed that generics were inferior. More than 2/3 of the respondents (70%) felt that for generics to be accepted, more confidence in patients should be built. 61% of medical practitioners and pharmacists, while prescribing drugs take into account the socio-economic position of patients. About a quarter of physicians and pharmacists think that generic medicine causes a higher side effect compared to the innovator's drug. Equal number of physicians and pharmacists (47%) have a contra view on the effectiveness of generics compared to branded drugs. These beliefs can represent an important obstacle to increased use of genetics and can lead to higher costs in health care. The quality, safety and efficacious of medicines were of paramount importance to doctors and pharmacists when prescribing / dispensing drugs.

2.3.35 2020 India - Acceptability and Perception of Generic Drugs

Cost of medicines has been observed as the focal point for perception amongst patients, pharmacists and doctors; pharmacists and doctors are not in favor of generic drugs because of concerns with efficacy as revealed in a study to evaluate acceptability and perceptions of generic drugs in Gujarat, West India (Patel et al., 2020). Most of the patients perceived cheaper generic drugs are meant for poor people.

2.3.36 2020 India - Cost Comparison, Physicians and Patients Perception on Generic vs Branded drug

Study on viewpoint of doctors and patients conducted in Kerala concerning generic drugs versus branded medicines (George et al., 2020), majority of physicians (86%) and patients (81%) preferred brand name medicines. Of ten branded alternatives of a molecule only three complied with the drug percentage purity as per the standards of Indian Pharmacopeia.

2.3.37 2020 USA - Physician's Perspective on Generic Drug Quality

In a study in USA (Lever, 2020), it was found repeated instances of inconsistency in results in patients in response to generic medicines particular originating from poorly regulated countries such as India & China. Medical condition of patients immediately improved by changing back from generics to what it was before.

2.3.38 2021 USA - Guidelines for Generic Drug

In its guidance on generic drug development (USFDA, 2021) the FDA states that a generic drug must be pharmaceutically equivalent to a reference listed drug, have the

same API, strength, dosage form, and administration route as the reference listed drug; must prove bioequivalence of its drug at par with the brand name drug meaning the level of drug in bloodstream to be the same as with the brand name drug demonstrating generic drug will work the same and is therapeutically equivalent i.e. it is substitutable for the reference listed drug with the expectation that the generic product will have the same safety and effectiveness as its reference listed drug.

2.3.39 2022 India - Key Issue in Prescribing Generic Drugs – Quality not Price

The issue in India with regards to generics is different compared to the West. In the West, the issue is about difference in price between brand name and generics, however, in India it is about suspect towards quality of generics. Leading companies like Cipla, Dr. Reddy's Lab, Sun Pharma and others which are popular for branded generics are trusted by doctors. MRs numbering close to a million of pharmaceutical companies have performed a good job in building trust with the medical practitioners. Transfer of trust to generics manufactured by unknown companies is impossible without promotion. Therefore, doctor's prescription in generic name will likely be dispensed by chemist another branded generic or a generic whose quality may be suspect (Soans, 2022).

2.3.40 2022 India - Why Generic Drugs Not So Popular

There are several reasons for unpopularity of generic medicines in India. Brand name is one reason. Brands are more popular be it Fast Moving Consumer Goods (FMCG) products, durables, clothes or medicines and have a powerful impact on people's mind. Price perception is another reason; a certain section of population feel generic

medicines may be of inferior quality because they are comparatively cheaper. Medical practitioners' support is another reason who usually prescribe branded medicines which are commonly used for treating lifestyle ailments such as hypertension, diabetes and others.

Therefore, to promote prescription of cheaper generic alternatives, physicians support is the most important factor. It is for this reason health ministry has decided to make it obligatory for the medical practitioners to prescribe medicines by generic names (Pharma Tutor, 2022).

2.3.41 2022 WHO - Accessibility, Affordability & Quality

WHO health expenditures data discloses OOPE as a share of health expenditure was 65% in India against the world average of 20% in 2016. Medicines account for single largest expenditure, share of which in OOPE has gone down to 43% in 2015-16 from 51% in 2013-14. Hence, cost of medicines is an important area to dwell on (Singh et al., 2022).

2.3.42 2022 India - Rural Population

In 2020, 65.07% population of India resided in non-urban areas (Index Mundi, 2022). Access to healthcare and affordability in rural areas has been a challenge where proportion of population below the poverty line is higher than the urban areas. According to a WHO report, a majority of Indian population (nearly 68%) has either inadequate availability or no access to essential medicines.

2.4 Summary

In general, mixed reactions were seen which was due to divergence of views because of several factors such as country development level, consumers' socioeconomic background, medicine reimbursement scheme, government policy, relations with doctors, experience with medicines in the past, and severity of illness. However, increase in display of knowledge and confidence towards generic drugs has been observed over the years, mainly in developed countries (Hassali et al., 2009).

2.4.1 Knowledge of Generic Medicines amongst medical practitioners

Insufficient knowledge about unbranded medicines is common amongst larger proportion of patients and customers in many countries (Alrasheedy et al., 2014). The studies showed gap in consumers' awareness and understanding about generic drugs. A great majority of participants at 95.2% in Sierra Leone (James et al., 2018) agreed to need of additional information on quality, efficacy and safety of generics. Deficient in awareness and misconception towards generic medicines was observed which can be overcome by providing training surrounding generic drugs.

Majority of the population in Brazil knew generic drugs cost less and quality is comparable to branded medicines (Bertoldi et al., 2005). 64% of consumers in Malaysia had awareness that generics cost less compared to branded counterparts (Nabil et al., 2008). 51.6% of the respondents in New Zealand had prior information of generic drugs (Babar et al., 2010).

In Brazil only 57 % knew packaging appearances differentiating generic drugs from brands (Bertoldi et al., 2005). 70% of consumers in Malaysia were not aware that

pharmaceutical companies can market generic medicines in different names (Nabil et al., 2008). Patients, pharmacists and doctors in Turkey have insufficient knowledge about generic medicines. (Toklu et al., 2012).

Doctors at a medical college in Central India had good awareness about generic medicines (Badwaik et al., 2015). A good percentage of doctors at a tertiary care hospital in South India (Gupta et al., 2015) were well versed with knowledge about generic drugs and exhibited good attitude towards quality, efficacy and safety of generics. However, in Italy, one of the factors hindering prescribing of generic medicines was the insufficient knowledge of generic drugs, only 32.6% of the doctors had good knowledge of generic drugs (Fabiano et al., 2012).

In New Zealand, participants with better knowledge on generic medicines were willing to switch to generic alternatives even for a major ailment (Babar et al., 2010).

Level of education and correct knowledge of generic had a direct relationship. In New Zealand, a highly educated consumers had correct knowledge of generics (Babar et al., 2010). In Malaysia educational intervention did improve knowledge about generic medicines, however, no change in perception was observed neither was there any increase in generic medicine prescription (Hassali et al., 2014).

The generic drug must prove to be bioequivalent with their branded counterparts (Chaturvedi, 2017). 86% of physicians and 81% of patients in a study in India desired branded medicines over generic medicines; among ten branded alternatives of a molecule only three complied with the drug percentage purity as per the standards of IP (George et al. 2020).

The USA FDA has strict regulations ensuring generic drugs are of high-quality ensuring delivery of medicines in blood concentrations at par with brand name products. (White et al., 2019). In a study in USA (Lever, 2020), it was found repeated instances of inconsistency in results in patients in response to generic medicines particular originating from poorly regulated countries such as India & China.

2.4.2 Attitude / Perception of medical practitioners towards Generic Medicines

In Finland doctors had knowledge that generics can be interchangeable with innovators, but about half of them believed that interchangeable medicines are not as safe and efficacious as branded medications (Heikkila et al., 2007).

32 % of consumers in Malaysia felt generic medicines may cause more side effects (Nabil et al., 2008). Negative opinions about generic medicines compared with their branded equivalents, are being held by a majority of doctors, pharmacists and lay people who perceive generic medicines low in quality, hence less safe and less effective (Colgan et al., 2015).

Majority of doctors (63%) at a tertiary care hospital located in South India agree to prescribing medicines in generic names, however, a significant percentage expressed concerns about generic medicines which shows a hurdle to wider generic drug use (Gupta et al., 2015). Concerns amongst resident doctors about effectiveness, safety and availability of generic medicines are the key for choosing branded medicines (Kamejaliya et al., 2017)

Patients', doctors' and pharmacists' perceptions mostly favored branded medicines despite comparable quality of generic and branded equivalents found in testing. In the

private sector, perceptions of generic drug quality and promotional activities tailored to doctors have led to the use of expensive branded drugs due to the perception of generic drugs as inferior (Aivalli et al., 2018).

In India, 61% of doctors held the view that generic medicines are inferior in quality compared to branded drugs (Tripathi & Bhattacharya, 2018). Lack of confidence in physicians and patients on the quality of generics is a major reason for prescribing branded medicines (Roy & Rana, 2018). Patients, pharmacists and physicians in Gujarat, West India observed cost as the main perception and were not in favor of generic drugs because of concerns with efficacy (Patel et al., 2020). Most of the patients perceived cheaper generic drugs are meant for poor people.

About a quarter of physicians and pharmacists think that generic medicine causes a higher side effect compared to the innovator's drug. Equal number of physicians and pharmacists (47%) have a contra view on the effectiveness of generics compared to branded drugs. These beliefs can represent an important obstacle to increased use of generics and can lead to higher costs in health care. The effectiveness, safety, and quality of medicines were of paramount importance to doctors and pharmacists when prescribing / dispensing drugs (Dhale et al., 2020).

2.4.3 Practice of medical practitioners

Limited therapeutic index drugs (43.5%) and fear of inferior quality (38.5%) are the factors restricting use of generics in India (Billa et al., 2014).

The main reason customers refused substitution was their positive experiences with previously used medicines (Heikkila et al., 2007). The percentage of people without

professional or specialized knowledge felt negatively with the generic substitution of branded drugs prescription was higher (34.03%) than the percentage of doctors and pharmacists at 24.11% and 11.04%, respectively (Colgan et al., 2015).

In Turkey, it was seen that there is no correlation between acceptance of generic drugs and demographics excluding education such as age, gender, and income (Toklu et al., 2012). However, an inverse association was found between acceptance of generic drugs and education level, i.e., acceptance of generic substitution is unlikely with more highly educated patients. Contrary to Turkey, in Brazil, people with high income choose to buy brand name drug (Bertoldi et al., 2005).

Several factors influence doctors' choices of medicines in Malaysia, including advertising and bonuses on products, patients' socio-economic position, and reputation of manufacturers (Chua et al., 2010). In a study on customer loyalty (Bachheti & Saklani, 2013), doctors' prescriptions are influenced by both rewards and close relationships with MRs. Pharmaceutical industry heavily depend on doctors for prescribing medications; doctors make the decision, not patients. Therefore, drug sales depend on pharmaceutical companies influencing doctors. A majority of doctors (62%) accept being influenced by marketing promotions of drug companies (Narayan et al., 2020). The doctors' prescriptions are largely driven by the promotional activities of pharmaceutical manufacturers which are carried out by MRs who make regular visits to the doctors (Shetti & Khanna, 2019).

Several leading pharmaceutical companies that produce branded generic medicines are trusted by doctors, including Cipla, Dr. Reddy's Lab, Sun Pharma, and others. Medical representatives numbering close to a million of pharma companies have

done a good job in building trust with the doctors. Transfer of trust to generics manufactured by unknown companies is impossible who largely sell products without engaging in promotion to doctors (Soans, 2022).

The problem is exacerbated by pharmaceutical companies that aggressively promote branded generic medicines. Non-adherence to GMP by pharmaceutical companies is a major concern regarding generic drug safety and effectiveness (Roy & Rana, 2018).

A good majority of doctors in an Indian college including residents, interns, and academicians (98.4%) are familiar with generic medicines, but this does not reflect in their prescriptions (Badwaik et al., 2015). The lack of availability, lack of awareness and poor attitude of patients regarding generic drug quality hinder the widespread acceptance of these medications (Tripathi & Bhattacharya, 2018). Training programs for healthcare providers may be essential to bridge the gap between knowledge and prescription practices of generic medicines was the conclusion drawn in a study (Singh et al., 2016).

Doctors' prescription in generic name will likely be dispensed by the pharmacist some other branded generic or a generic with questionable quality (Soans, 2022).

2.5 Rationale of research focussed on doctors

Research suggests that the majority of patients' decision for acceptance of generic medicines is based on learning about generic medicines from healthcare professionals

Medical prescription and price are the most important factors in choosing medicines as concluded by the authors, a majority of patients bought exactly what was prescribed (Bertoldi et al., 2005)

Medical practitioners and pharmacists should endorse use of generic drugs to increase its acceptance among patients. Due to prescribing of branded medicines by physicians (Hoshi & Kimura, 2008) is one reason for not much use of generic medicines by patients.

Physicians and pharmacists, along with activities aimed at educating patients, need to promote and recommend generic medicines more often. (Nabil et al., 2008), the source of information about generic medicines has been the pharmacists as stated by 34% of consumers. The prime indicators to increase usage of generic medicines are knowledge in consumers and the advice of doctors & pharmacists (Babar et al., 2010). In Iraq, education by doctors and chemists appear to be the best method to promote generic drugs to consumers (Sharrad & Hassali, 2011).

Several obstacles prevented doctors from prescribing generic medicines in Iraq, including their unwillingness to prescribe generics, mixing up different brands, and presence of counterfeits (Sharrad & Hassali 2011).

In the recommendation of generic medicines and generic substitution, physicians and pharmacists have an important role to play in educating patients (Alrasheedy et al., 2014). Most respondents did not agree to pharmacies substituting branded medicine with a generic one because they had doubts about generic drugs' quality, effectiveness and safety (Kamejaliya et al., 2017).

In India, the price difference for generics to patient was not high but profit margins to chemists were very high for branded generics. The focal point of the study is to change policy on drug pricing, control mark-ups, conduct tests and extensively advertise quality of generics (Singal et al., 2011).

The use of generic medicines is expected to increase as a result of mass education, incentives, and improved communication between patients and health care professionals (Hassali et al., 2009). Thus, patients need to be educated about unbranded medicines. (Alrasheedy et al., 2014). Therefore, promotions imparting education about generic medicines to medical practitioners and consumers seem to be the best approach going forward for increasing acceptance of generic medicines (Guttier et al., 2017).

2.6 Research gap

Knowledge Gap

Further studies mostly in developing countries including the decision-making processes for generic medications were needed where savings in cost are required more than in developed nations (Hassali et al., 2009).

Numerous studies have been carried out globally exploring perception, knowledge, attitude, practice etc. of generic medicines amongst population, patients, pharmacists and prescribers of generic medicines. Most of the studies conducted are in developed countries, further studies mostly in developing countries are required assuming knowledge, attitude and practice have a significant influence on doctors in prescribing generic medicines. . Considering demographics and other factors, the need for cost savings and the decision-making process for prescribing generic medicines is more in developing countries.

Population Gap

Most of the studies conducted to assess perception, knowledge, attitude etc. are focused on patients, customers and population however, limited studies are available focused on doctors. It is assumed that medical practitioners are the most important protagonists in promoting generic medicines.

The studies available on perception of doctors towards generic medicines, largely limited to few tertiary care hospitals in India were mostly pilot in nature but were able to offer initial findings and valuable understandings to encourage further research in this under-researched area assuming there may be some differences in areas related to either knowledge, attitude or practice towards generic medicines amongst doctors serving primary, secondary or tertiary health care centers or amongst doctors who are self-employed, engaged in government or private hospitals.

2.7 Research framework of the study

Analyzing the doctor's behavior in prescribing generic medicines is essential to developing an understanding with an aim to explore the key underlying factors for low usage of generic medicines in the country. An honest explanation for the fact that generic medicines have low acceptance could be that doctors lack knowledge and or have negative attitude about generic medicines and or have practice that favors prescribing brands.

Research framework developed for the study is given in figure 2.1

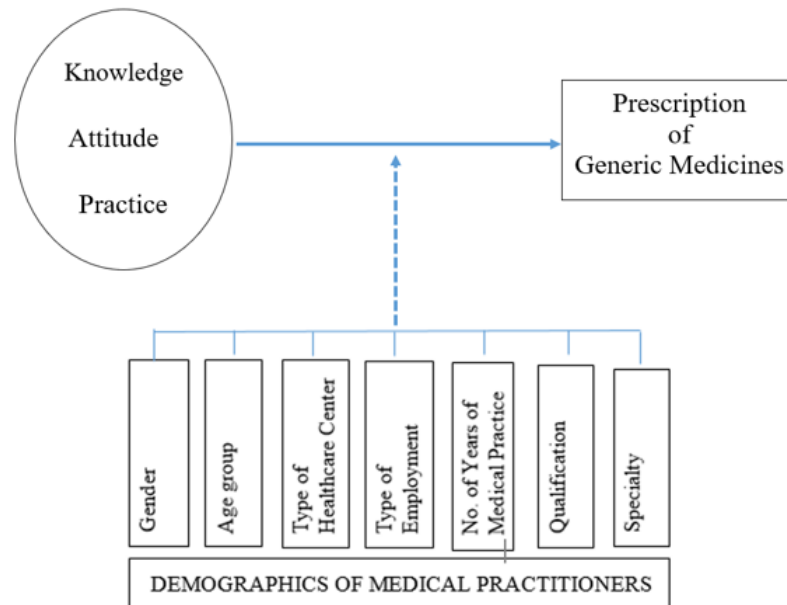


Figure 2.1 Research Framework

To understand doctor's prescription behavior Tri-component attitude model is used which illustrates cognitive-affective-conative processes of decision making which is a psychological process model for humans. Cognitive term in the model illustrates thinking capacity including skills in decision-making of a person. Cognitive psychology is involved into reading mind of a person. Affective, another psychological term and part of Tri-component model relates to emotions & motivation. A person may have positive or negative emotions depending on the situation and persons thinking ability. There are many ways to influence or motivate doctors by engaging them in seminars, conferences and with inducements such as incentives, gifts and holiday trips as part of product promotion. Conative, another term & part of Tri-component model, refers to natural human tendency which may be impulsive or focused effort. Conative directs action on any thought process which may vary from an individual to individual. Tri-component model is given in figure 2.2

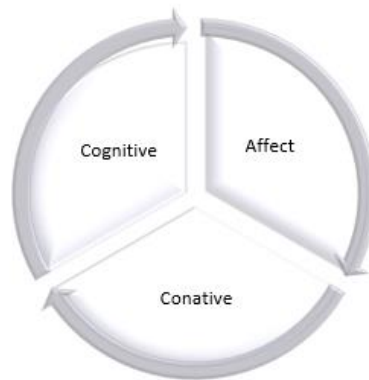


Figure 2.2: Tri-component model of Cognitive-Affective-Conative process of decision making

The research work will be directed in analyzing the doctors' behavior using the three dimensions of Tri-component model i.e. cognitive, affective, and conative (Singh et al., 2016; Dohle & Siegrist, 2014). The study will examine different likely predictors of generic medicine acceptance and its usage amongst medical practitioners as shown in figure 2.3. Finally, the results may explain why generic medicine acceptance and use is limited. Additionally, some of the significant insights could help in developing marketing promotional strategies or focused interventions that may lead to accomplishment of national objective in increasing acceptance and usage of generic medicines to bring down the healthcare costs.

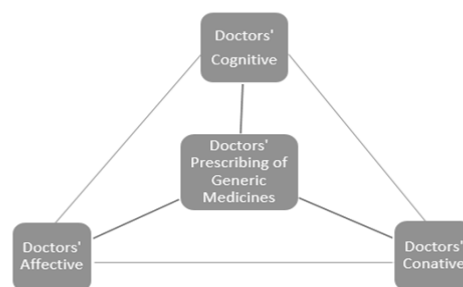


Figure 2.3 Tri-component model (Knowledge, Attitude, Practice influencing doctors in prescribing Generic Medicines)

Table 2.1 A summary of studies included in the review of literature evaluating knowledge, attitude & practice towards generic medicines amongst doctors, population, patients, pharmacists

Study	Country	Focus Area	Outcome
Bertoldi et al. 2005	Brazil	Awareness of generic drugs & its use	Medicines represent 37.0% of household expenditure on health, the authors estimated 3.9% share of generics to total medicines. 86% of population knew generic drugs are inexpensive and 70% recognized quality is comparable to branded drugs, however, only 57% recognized packaging appearances that differentiates generic drugs from brands. People having higher income choose to buy branded medicines. Medical prescription and price are the most vital factors in selecting medicines as concluded by the authors, a majority of patients bought exactly what was prescribed.
Heikkila et al. 2007	Finland	Customers' & physicians' opinions and experiences	Doctors had knowledge that generics can be interchangeable with innovators, but about half of them believed that interchangeable medicines are not as safe and effective as branded medications. The primary reason for generic substitution is to save money, and it is generally considered a good reform measure. Customers cited their positive experiences with previously used medicines as the main reason for refusing substitution. Wider acceptability of generics by customers is also vital of its increased usage.
Hoshi & Kimura, 2008	Japan	Knowledge among patients and healthcare professionals	It was concluded that along with the promotion of generic medicines in the media, pharmacists and medical practitioners must endorse use of generic drugs to increase its acceptance among patients. One of the reasons for patients nonuse of generic drugs is due to prescribing of branded medicines by physicians.
Nabil et al. 2008	Malaysia	Consumers' perceptions & awareness of generic medicines	only 28.3% of the respondents could relate with the term generic medicines, 70% had no awareness that generic drugs can be marketed by pharmaceuticals companies in different names, 34% stated pharmacists gave information regarding generics, 32 % felt branded medicines cause less side effects than generics, 64% had awareness that branded medicines cost more compared to generic alternatives. The survey revealed gap in awareness and understanding of consumers towards generic drugs. Physicians and pharmacists, along with activities aimed at educating patients, need to promote & recommend generic medicines more often. Research suggests that the majority of patients' decision to take generic medicines is based on learning about generic medicines from healthcare professionals.
Hassali et al. 2009	Global	Consumers' opinions of generics	Twenty identified studies (eighteen in developed economies, only two in developing economies excluding India) from 1970 to 2008. In general, mixed reactions were seen by the consumers which was due to divergence of views because of several factors such as country development level, consumers' socioeconomic background, medicine reimbursement scheme, government policy, relations with doctors, experience with medicines in the past, and severity of illness. Increase in display of knowledge and confidence towards generic drugs has been observed over the years, especially in developed countries. Interventions contributing to increase in usage of generic medicines were seen as educating masses, monetary incentives, and larger communication amongst health care professionals and patients. Further studies mostly in developing countries including the decision making processes for generic medications were needed where savings in cost are required more than in developed nations.
Chua et al 2010	Malaysia	General practitioners' knowledge & opinions	85.1% of GPs claimed active prescribing of generic medicines, however, less than 5% could correctly identify bioequivalence standard for generic medicines and respondents in majority believed generic drugs in dosage are equivalent to the branded medicines. However, there were misconceptions with regards to generic medicines among the respondents in areas such as bioequivalence, effectiveness, safety, and standards in manufacturing. GPs believed that a host of approaches are required such as issue of standard guidelines for substitution of brand, to work together with pharmacists, education to patients besides information on performance of generic medicines in safety and effectiveness were essential to ensure increased acceptance of generics. Furthermore, product promotions by way of mass media and promotional incentives offered by pharmaceutical companies, socio-economic status of patients and reputation of manufacturers were factors that may sway choice of medicine.
Babar et al. 2010	New Zealand	Consumers' awareness, opinions & attitudes	51.6% of the respondents had awareness of generic medicines which is attributed to pharmacists who being the leading source of information followed by medical practitioners and media. A direct relationship was seen between higher level of education and correct knowledge of generics. Knowledge of generics determined participants' attitude towards the practice of generic drugs. Participants (79%) were willing to change to a generic for a minor illness. Participants with enhanced knowledge were willing to change to generic medicines for a major illness. Previous positive experience also determined their willingness to use generics. The main indicators to increase use of generics were the advice of medical practitioners and pharmacists along with having knowledge about generic medicines.
Sharrad & Hassali, 2011	Iraq	Consumer perception about generic medicines	Education by doctors & chemists appear to be the best method to promote generic drugs to consumers, mix-up over different brands & presence of counterfeit medicines. Majority of the participants conveyed acceptance of generic substitution with the doctor's approval whereas a few would accept on recommendation of chemists. To overcome gap in knowledge of consumers in Iraq, the study concluded that the education about the benefits of generic medicines is a need to overcome gap in knowledge of consumers.

Study	Country	Focus Area	Outcome
Singal et al. 2011	India	Price and quality comparison between branded and generic medicines	Price difference to patient was not high but profit margins to chemists were excessive for branded generics. The highlights of the study are focused on the need to change policy on drug pricing, control mark-ups, conduct tests and extensively advertise quality of generics.
Toklu et al. 2012	Turkey	Pharmacists', doctors' & patients' knowledge & attitudes	Patients, pharmacists and doctors have inadequate knowledge about generic drugs. No association was seen between acceptance of generic drugs and demographics (excluding education) such as age, gender, and income. However, inverse association was found between acceptance of generic drugs and education level, i.e., acceptance of generic substitution is unlikely with more highly educated patients.
Fabiano et al. 2012	Italy	Pediatricians' opinions & patterns with generic drugs	Only 37.2% of respondents had sufficient knowledge and 32.6% of the doctors had good knowledge of generic drugs. One of the reasons hindering prescribing of medicines in generic names was the insufficient knowledge of generic medicines.
Bachheti & Saklani, 2013	India	Doctor-manufacturer relationships in pharma	Rewards to doctors and striking of close relationships between doctors and MRs influence doctors' prescription.
Alrasheedy et al. 2014	Global	Patient - awareness, opinions and acceptance of generic medicines	Literature review of fifty-three studies for the period 1990 – 2013 from Europe (twenty-four), North America (ten), Asia (six), Australia and New Zealand (five), Middle East (five), and one each from Africa, Latin America, and the Caribbean region showed that patients are unlikely to favor generics over branded medicines. Insufficient knowledge about unbranded medicines is common amongst larger proportion of patients and customers in many countries. Thus, patients need to be educated about unbranded medicines. The literature review also shows that in the recommendation of generic medicines and generic substitution, doctors and pharmacists have an important role to play in educating patients.
Hassali et al. 2014	Malaysia	Educational intervention for improving doctors' awareness and perceptions	Prior to educational intervention doctors held insufficient knowledge and misunderstanding about generic drugs. Educational intervention did improve knowledge on bioequivalence, equivalent generic medicines and required standards for safety for registration of generic medicines. However, no significant change in perception was observed and also there was no impact in prescribing of generic medicines
Billa et al. 2014	India	Doctors' awareness and opinions	High proportion of government doctors (GDs) and private doctors (PDs) at 97% and 72% respectively are concerned with high cost of medicines. GDs and PDs at 80% stated that more than cost, safety and efficacy were more important. A majority of GDs (71%) and PDs (65%) knew about the various methods in bringing down the cost. Drugs were graded according to cost by 24% of GDs and 65 % of PDs. High proportion of GDs (94%) and PDs (73%) stated that life-saving drugs should not be covered under patent protection. Stepwise introduction of generic medicines by 64% of GDs and 10% of PDs and the use of generics by 20% of GDs and 10% of PDs was stated. Factors preventing use of generics were due to limited therapeutic index (43.5%) and fear of inferior quality (38.5%).
Colgan et al. 2015	Global	Generic medication - perceptions in population, medical practitioners, pharmacists	The publication included data from twenty-seven countries from 1987 to 2015. On effectiveness, a majority of general population 35.59% believed generic drugs were not as effective as branded equivalents compared to doctors 28.68% and pharmacists 23.60%. On quality, minimum 25% from each group (pharmacist 33.39%, physicians 28.04%, general population (25.11%) believe generic medicines are not at par on quality of branded medicines. On side effects of generics, doctors believed generics caused more side effects (24.43%), pharmacists (17.56%) and lay people (18.76%). On safety, a higher number of doctors (28.54%), pharmacists (21.44%) and general population (17.97%) perceived generic medicines less safe compared with branded medicines. A higher number of lay people (34.03%) felt negatively about substitution of branded drugs with generics compared to doctors (24.11%) and pharmacists (11.04%). It is likely these attitudes towards generic medicines amongst medical practitioners act as barriers to wider use of generics.
Badwaik et al. 2015	India	Prescribers' view at medical institute in Central India	98.4% of the participants comprising of junior residents, interns, senior residents and academicians had a good knowledge about generic drugs, however, it was not reflected in their prescriptions of medicines in generic names thus revealing a cliff between knowledge, attitude and practice

Study	Country	Focus Area	Outcome
Gupta et al. 2015	India	Generic medicines - doctors' knowledge, attitude and practice at a tertiary care hospital in south India	A good percentage of doctors had awareness about generic drugs and displayed good attitude towards quality, efficacy and safety of generics. Majority of the doctors (63%) agree to prescribing medicines in generic names, however, a significant percentage expressed concerns about efficacy & safety of generic medicines which shows a hurdle to wider generic drug use
Singh et al. 2016	India	Beliefs and attitudes of generic vs original drugs	Training programs for healthcare providers may be essential to bridge the gap between knowledge and prescription practices of generic medicines was the conclusion drawn in a study
Kamejaliya et al. 2017	India	Resident doctors' knowledge, attitude & practice of generic medicines at a tertiary care teaching hospital in West India	Majority of the respondents held the opinion that generic medicines are low in prices because of low-grade quality (71.9%), have unsure efficacy in serious diseases (44.6%), can be prescribed in all diseases (61.9%) and prescription of generic medicines should be mandatory (37%). The doctors preferred brands over generic medicines due to reasons such as concern about efficacy (100%), concern about safety (61.57%), poor availability of generic medicines (57.85%), inadequate availability of information (33.06%). Majority of the respondents did not agree to substitution of prescribed branded medicine with a generic one by pharmacist due to doubts about quality, effectiveness and safety of generic medicines and hence, may not desire substitution of former.
Chaturvedi, 2017	India	Possible issues, impacts & consequences with generic medicines prescription	The generic drug can considerably bring down the cost involved in the treatment but without compromising efficacy and safety. The generic drug must prove to be bioequivalent with their branded counterparts. The possible and immediate effect of this decision will be that the unethical or commission based prescription by doctors will be hampered
Guttier et al. 2017	Brazil	Population-factors influencing purchase of generic drugs	88.1% of the participants had awareness that generic medicines were inexpensive than reference medicines, 69.8% held the view of an equivalent quality and 76.6% correctly identify the difference in the packaging of generic drugs from other drugs. Direct positive relationship was seen between knowledge and preference for buying generic drugs. Participants (77.7%) showed preference for buying generic drugs due to good knowledge about them compared with 18.4% who had insufficient knowledge. Therefore, knowledge is associated with the preference for purchase of generic medicines by the population, the higher the knowledge, the greater is the preference to buy them. Therefore, educational campaigns for medical practioners and consumers seem to be the best way going forward for increasing acceptance of generic medicines.
Gupta et al. 2018	India	Doctors' awareness of generic drugs at a tertiary care hospital in North India	62.9% doctors consented with intended interchangeable of branded medicine with generic alternative. 77.5% of doctors had awareness on conduct of bioequivalence studies of generic medicine along with the branded counterparts. 88.8% of the doctors agreed to teaching the significance of generic medicines in initial stage of internship. 80.9% doctors were of thinking that outcome of treatment may not change in substituting a brand-name medicine with an equivalent generic. To address the concerns of a portion of respondents with an aim to increase awareness and acceptability of generic alternatives, further focused efforts on interventions for doctors and public is required.
Aivalli et al. 2018	India	Quality perceptions of generic medicines amongst patients, doctors, pharmacists	Patients', doctors' and pharmacists' perceptions mostly favored branded medicines despite comparable quality of branded medicines and their generic alternatives found in testing. Negative perceptions on quality of generic drugs and doctors' oriented promotional activities by pharmaceutical companies for branded drugs is leading to choosing expensive branded drugs in the private sector.
Tripathi & Bhattacharya, 2018	India	Patient perception about generic from Janaushadhi Kendras vs branded medicines in a tertiary care hospital	72% of the respondents had heard of generic drugs and 65% could differentiate branded and generic medicines. Despite 67% consented that branded medicines are expensive, only 35% of them were willing to buy generic alternatives as 61% of them held the view that generic medicines are of low quality in comparison to branded medicines. Majority of the patients neither asked doctor (64%) nor pharmacist (59%) to recommend or dispense generic drugs. According to patients (45%), branded medicines were preferred over generic drugs by doctors. The factors that hinder widespread acceptance in prescribing and dispensation of generic drugs is due to the partial availability, insufficient awareness and attitude of patients concerning quality of generic drugs.

Study	Country	Focus Area	Outcome
Roy and Rana, 2018	India	Prescribing generics	Lack of confidence in physicians and patients on the quality of generics is a major reason for prescribing branded medicines. Pharmaceutical companies engaged in aggressive promotion of branded generic medicines further augments the problem. A major concern regarding safety and effectiveness of generic drugs is due to non-adherence to Good Manufacturing Practices (GMP) by pharmaceutical companies.
James et al. 2018	Sierra Leone	Awareness and opinion of generic medicines amongst final year students of undergraduate programs in medical, pharmacy, nursing	3.2 % of the participants had information on acceptable bioequivalence limit. Minimum half of the respondents in each of the group agreed the therapeutically equivalence of generics to innovators' product. Medical (50%), nursing (66.6%) and pharmacy (45.5%) believed that innovators' products are required to comply with higher safety standards over generic alternatives. A great majority at 95.2% agreed need of additional information on quality, efficacy and safety of generics. Deficient knowledge and misconception towards generic medicines was observed which can be overcome by providing training surrounding generic drugs.
Shetti & Khanna, 2019	India	Willingness to prescribe generic drugs	Majority of the doctors who are presently prescribing generic medicines to less number of patients are interested to prescribe to more number of patients. The preference of doctors to prescribe generic drugs ranged from poor / below the poverty line (BPL) patients, middle-class families, elderly or retired patients and working class patients in that order.
White et al. 2019	USA	Generic drugs not as safe	Overall, generics account for 90% in volume of prescribed medications in the USA but are valued at 26% of drug spending resulting in saving of \$1.7 trillion dollars in the past decade. There has been a shift in manufacturing, approx. 80% of Active Pharmaceutical Ingredients (APIs) and 40% of finished dosage forms has moved out of USA. USA FDA approved 781 new generics in 2018 setting a new record; has strict regulations in complying with delivery of medicines in blood concentrations at par with brand name medicines. However, it has been observed that there are gaps in adherence to GMP by companies indicating falsification, adjustment or non-disclosure of data from the FDA. Instances point to companies in India, China & Italy.
Narayan et al. 2020	India	Effect of marketing promotional strategies	62% of doctors acknowledge having been influenced by marketing promotional strategies. However, irrespective of promotional activities, doctors give attention to socioeconomic status of the patients while prescribing medication.
Dhale et al. 2020	India	Medical professionals & pharmacists - opinions towards generic & branded drugs	59% of the respondents perceived the effectiveness of generic drugs at par with original drugs, however, 23% believed that generics were ineffective based on their experienced difference in quality between the generics and original drugs. A gap has been identified between the knowledge and generic perspective on new drugs. Less than 2/3 of respondents (64%) agreed with the safety of generics as with innovators' medicine. Less than half (46%) agreed that generics were inferior. More than 2/3 of the respondents (70%) felt that for generics to be accepted, more confidence in patients should be built. 61% of medical practitioners and pharmacists, while prescribing drugs take into account the socio-economic position of patients. About a quarter of physicians and pharmacists think that generic medicine causes a higher side effect compared to the innovator's drug. Equal number of physicians and pharmacists (47%) have a contra view on the effectiveness of generics compared to branded drugs. These beliefs can represent an important obstacle to increased use of genetics and can lead to higher costs in health care. The effectiveness, safety, and quality of medicines were of paramount importance to doctors and pharmacists when prescribing / dispensing drugs.
Patel et al. 2020	India	Acceptability and perception of generic drugs	Cost of medicines has been observed as the focal point for perception amongst patients, pharmacists and doctors; pharmacists and doctors are not in favor of generic drugs because of concerns with efficacy Most of the patients perceived cheaper generic drugs are meant for poor people.
Lever, 2020	USA	Physician's perspective on generic drug quality	Repeated instances of inconsistency in results in patients in response to generic medicines particular originating from poorly regulated countries such as India & China were found. Medical condition of patients immediately improved by changing back from generics to what it was before.