



Predictors of Self-Medication Behavior: A Systematic Review

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Abstract

Background: Self-medication with over the counter (OTC) and non OTC drugs may provoke serious consequences for users and societies. Recognition of its predictors therefore, is pivotal in plans to hinder the aggregating behavior. This study aimed to identify possibly all predictors of self-medication and the range of its prevalence among different populations.

Methods: Medline, Amed, Scopus, Medlib, SID, Pub Med, Science Direct, and super searcher of Google Scholar were scrutinized using “self-medication”, “self-prescription” and “self-treatment” key words without a time limit with special focus on Iranian studies. Authors independently assessed the title, abstract and full text of identified articles for inclusion and any disagreement was resolved with consensus.

Results: The range of reported self-medication in the 70 included publications was 8.5-98.0%. Having a minor illness (15 studies), health care costs (9 studies), lack of adequate time to visit a physician (11 studies), prior experience (7 studies) in using a drug and long waiting time to visit a qualified practitioner (5 studies) were most frequently reported reasons of self-medication.

Conclusion: The observed diversity in the reported prevalence and reasons of self-medication among different sub-groups of populations (e.g. males vs. females) and between developed and developing countries highlights the importance of explanatory behavioral chain analysis of self-medication in different population groups and countries. Even within a single country, predictors of this harmful practice could be inconsistent. Lack of sufficient quality research to identify precipitating factors of self-medication in developing countries is paramount.

Keywords: Self-medication, Self-prescription, Self-treatment, Predictors, Risk factors

Introduction

People react differently when encounter an illness. The chosen treatment option may depend on socioeconomic and cultural factors and also on sick persons' perceived susceptibility and seriousness of the disease (1, 2). Self medication as one of the common selected choices (3) is defined as a self designated practice of using synthetic or hand-made drugs or following an unprofessional advice. Use of previously prescribed drugs for own, friends and family members, using left over drugs at home and failing to adhere to the prescribed

treatment plan (prolonging or shortening treatment period) or change in the applied dose of the prescribed drugs could also be categorized as self medication (4-7).

Despite efforts to limit prevalence of self medication, its increase was evident in different countries (8) which may pose serious threats to the health of individuals and larger societies.

Notwithstanding, self medication can mitigate improvement of mild illnesses and thus relinquish needs to medical consult and alienate pressure on

medical services' supply especially in less developed and developing countries (9, 10). Use of drugs particularly prescription only medicines (POM) without receiving professional advice; however, may have several consequences of which bacterial resistance, drugs' interactions, prolonged treatment period, serious side effects, fail in optimal treatment, intentional and unintentional poisoning, increase of malignant and lethal diseases and drug dependency (11-13) are eminent. They are sometimes irreversible (e.g. hepatic and renal disorders) and may multiply treatment costs (14).

The reported prevalence of self-medication is not compatible in different parts of the world and ranges from 12.7% in Spain (15) to 75% in southern Chile (16), 40-60% in the Vietnamese (17), 32% in the Chinese (18), 71% in the Indians (19), 48% in the high school students of Kuwait (20), 98% in the Palestinian students (21), 18% in the Spanish adults (22), 21.5% in the Portuguese's villagers (8) and 61% in Mexico (23).

The estimated per capita drug consumption in Iran is higher than the reported figures in many countries of the world (24, 25). Self medication was introduced as one of the important precipitating factors for such a drug consumption pattern. Its prevalence was reported to be 7.83% (26) among the medical and engineering students, 3.8% (27) in a sample of teachers in northern city of Babol and 57.7% (24, 25) among the elderly people of Tehran.

Demographic and socioeconomic circumstances (12, 16), poor access to health care (4, 19, 28, 29), increase of lay people's awareness about treatment protocols (3, 16, 30), change in the treatment approaches and pattern of diseases (11), high costs of health care (6, 23) and ease of drugs' purchase without having a prescription (31, 32) are among the frequently reported provoking factors of self-medication around the world.

Since we have not a clear and inclusive overview about the leading factors of self medication in Iran, we attempted in this systematic review to identify all probable causes of the behavior as our first step to plan a population based study on prominent self medication's predicting factors.

Methods

Several databases including Ovid, Medline, Amed, Scopus, Medlib, Pub Med, Science Direct and also the Scientific Information Database (SID) which is a national database of published articles in the Iranian journals were scrutinized without a time limit from inception to February 2013. A general search were also conducted in Super Searcher of Google Scholar using the keywords of "self-medication", "self prescription" and "self treatment" and their Persian equivalent for unpublished materials within the mentioned time limit. All publications and reports of non-interventional population based studies that presented prevalence of self-medication and its causing factors in English or Persian were included. Those studies that reported self medication using traditional or herbal medicines or over the counter (OTC) drugs and also studies that were conducted on institution based samples were excluded. A customized data extraction sheet was used to summarize and record the required data. Quality of the studies were determined based on the inclusion of sample size, sampling method, sampling frame, study feature and precise report of the outcome variables including prevalence of self medication and its contributing factors. The authors assessed quality of the retrieved publications independently and any disagreement was resolved with consensus.

Results

We found 1514 articles that had the study's primary inclusion criteria. Two additional studies were found through serendipitous discovery. Titles and abstracts of these papers were checked and 1121 irrelevant or duplicate studies were excluded. In the second stage 395 remaining abstracts from previous stage were scrutinized that led to exclusion of 297 abstracts due to inconsistency with the objectives of this systematic review. Full text of 98 articles assessed for eligibility at the next step and 28 were excluded due to poor reporting quality or irrelevant methodology applied. Finally, 70 studies

were selected based on the inclusion criteria (Fig. 1). Among the included studies the prevalence of self medication was reported in the 39 papers and its

range was from 8.0% in children and adolescents of Germany (33) to 98.0% in the Palestinian university students (21) (Table 1).

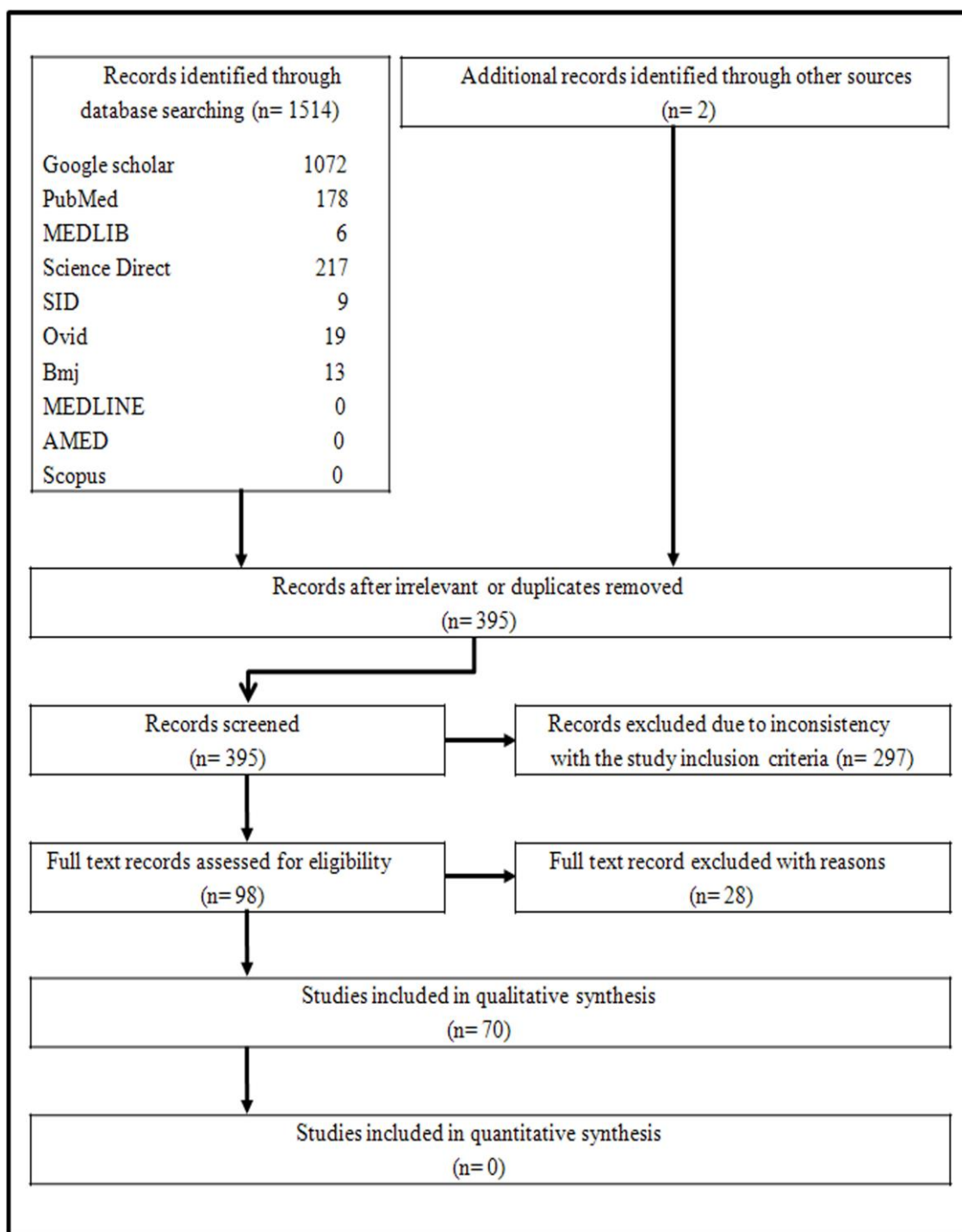


Fig. 1: PRISMA flow diagram of the study search findings

Table 1: Reported prevalence of self-medication (PSM) in the included studies

Study	PSM (%)	Sampling frame	Study Location
(1)	92.0	University students	Slovenia
(34)	81.5	R* population	India
(19)	71.0	R* and U* patients	India
(35)	69.0	General population	India
(5)	31.0	General population	India
(6)	42.5	General population	Jordan
(20)	92.0	Schools' students	Kuwait
(23)	61.0	General population	Mexico
(10)	76.0	University students	Pakistan
(36)	39.0	General population	Ethiopia
(37)	27.5	Patients	Ethiopia
(12)	27.0	General population	Ethiopia
(21)	98.0	University students	Palestinian
(38)	51.0	General population	Ecuador
(33)	8.0	Children/adolescents	Germany
(15)	75.0	General population	Chile
(22)	45.0	People having colds	Spain
(39)	38.0	Nursing students	Brazil
(40)	35.4	Patients	Saudi Arabia
(41)	94.0	University students	China
(42)	60.0	University students	China
(18)	32.0	General population	China
(43)	80.9	Female Students	Malaysia
(44)	88.0	University Students	Nigeria
(28)	8.5	Patients	Nigeria
(31)	91.0	University students	Iran
(39)	86.0	Women	Iran
(14)	83.0	University students	Iran
(25)	80.0	University students	Iran
(45)	77.6	Elderly people	Iran
(46)	64.0 (U)* 52.7 (R)**	People having cold	Iran
(47)	61.0	General population	Iran
(48)	49.2	Patients	Iran
(49)	35.0	University staff	Iran
(50)	31.0	Elderly population	Iran
(9)	21.7	Diabetic patients	Iran
(51)	15.9	Ilam population	Iran
(52)	8.3	Tehran population	Iran
(27)	8.3	Teachers	Iran

* U: urban

** R: rural

The precipitating factors of self medication were reported in 31 recruited publications that were shown in Table 2. Since more than one self medication inducing factor was introduced in the retrieved studies the total number of indicated papers in the table is more than the number of included research publications. Self medication be-

havior in developed countries compared to the developing countries occurs due to different precipitating factors as shown in Table 3.

Sign of disease or reason(s) that triggered self medication behavior among the studied target groups in the retrieved publication were presented in Table 4.

Table 2: Reported self medication inducing factors in the recruited research

Causes of self medication	Number of reporting publications
Simple sign and symptom of a disease	15 (6, 15, 18, 19, 21, 23, 24, 28, 32, 41, 44, 45, 53, 54, 55)
Lack of time and to save time	11 (14, 15, 19, 25, 31, 39, 43, 53, 55, 56, 57)
High costs of visits to doctors	9 (3, 6, 21, 23, 28, 29, 44, 53, 56, 58)
Experience of good result from self medication	9 (3, 14, 15, 19, 24, 44, 45, 50, 58)
Easily purchasable medications from pharmacies	9 (14, 25, 31, 32, 34, 38, 45, 49, 59, 60, 61)
Previous experience of illness and symptoms	7 (10, 15, 47, 50, 55, 58, 59)
Lack of health insurance	6 (23, 25, 52, 45, 62, 63)
Low income, economic problems	6 (12, 29, 32, 45, 47, 49, 64, 65)
Long waiting time to visit physicians	5 (6, 8, 15, 44, 65)
Low trust on medical services	5 (21, 44, 45, 47, 65)
Lack of access to medical services	4 (19, 23, 28, 49)
Low perceived seriousness of the disease	3 (3, 14, 64)
Lack of trust on doctors	3 (1, 45, 47)
Similar prescription by physician	3 (24, 53, 58)
Not experiencing complications with self medication	2 (49, 55)
Having drugs at home	2 (25, 50)
Belief in medication safety	2 (14, 25)
Low cost of purchasing drugs	2 (14, 25)
Awareness about the effect of drugs	2 (18, 43)
Quickness of resolving the problem	2 (15, 19)
Previous prescription	1 (3)
Distance to health care centers	1 (65)
Diagnosis and control of disease by GP	1 (31)
Influence of peers and parents	1 (1)
Advertisement in media	1 (32)
Ineffectiveness of prescribed drugs by physician	1 (43)

Table 3: Comparison of the reported self medication inducing factors between developed and developing countries in the recruited research

Causes of self medication	Number of reporting publications in developing countries	Number of reporting publications in developed countries
Mild illness	6 (6, 23, 19, 53, 54, 66)	1 (15)
Expensiveness of visits to physician	5 (6, 23, 28, 53, 58)	NR*
Good result of self medication	3 (19, 58, 66)	1 (15)
Long waiting time to visit a physician	3 (6, 8, 28)	2 (15, 65)
Previous experience of illness and symptoms	3 (6, 27, 58)	1 (49)
Poverty and low income, economic problems	3 (12, 27, 49)	1 (65)
Similar prescription by physician	3 (24, 53, 58)	NR
Easy to buy medications from pharmacies	2 (49, 60)	NR
Lack of health insurance	2 (23, 62)	NR
Lack of time, saving time	2 (19, 53)	1 (15)
Ease of resolving the disease	1 (19)	1 (15)
Effect of mass media programmes	NR	1 (65)
Low trust on medical services	NR	1 (65)

* NR: Not reported

Table 4: Reported sign of disease or reason that triggered self medication behavior in the included studies

Sign or reason that triggered self medication behavior	Number of reporting articles
Fever	10 (10, 11, 12, 17, 19, 42, 43, 47, 49, 57)
Headache	9 (10, 12, 19, 36, 38, 39, 42, 43, 47)
Cough	8 (8, 17, 19, 36, 41, 42, 54, 55)
Cold	7 (2, 8, 19, 37, 41, 47, 55)
Sore throat	6 (19, 49, 42, 47, 55)
Diarrhea	4 (12, 17, 47, 54)
Pain	3 (2, 10, 11)
Respiratory diseases	3 (2, 43, 67)
Anemia	2 (2, 48, 67)
Digestive problems	2 (2, 67)
Neurological diseases	1 (67)
Menstrual disorders	1 (67)
Skin Problems	1 (2)
Oral and dental problems	1 (42)
Cardiovascular disease	1 (2)
General health improvement	1 (42)

Fever and headache were the most common felt signs for which self medication initiated. Sources of information to commence self medication behavior were pinpointed in Table 5. Family and

relatives, friends, information received based on previous prescription of drugs by a physician and pharmacist were the most frequently reported source of information for self medicators.

Table 5: Source of information to attempt self-medication by the respondents in the recruited studies

Source of information to attempt self medication	Number of the reporting articles
Family and relatives	8 (5, 18, 20, 21, 39, 41, 43, 65)
Friends	7 (5, 6, 18, 19, 21, 43, 65)
Previous prescription by physician	7 (5, 6, 19, 48, 53, 65, 67)
Prescription of a pharmacist	6 (5, 6, 19, 48, 53, 65)
Neighbors	3 (5, 6, 65)
Textual materials	3 (19, 20, 36)
Advertisements	2 (18, 20)
Health care delivery staff	2 (6, 20)
Television	2 (19, 20)
Internet	1 (20)

This is concordant with the source of drug supply by those who have reported performing self medication behavior (Table 6).

Types of applied drugs for self medication purpose were presented in Table 7. Analgesics and anti infection drugs were most frequently applied medications by the study participants in the recruited studies.

Table 6: Reported self medicators source of drug

Source of drug supply	Number of reporting publications
Pharmacy	8 (1, 10, 36, 41, 55, 60, 68, 69)
Stored drugs at home	5 (10, 18, 42, 43, 69)
Friends	4 (1, 10, 36, 68)

Findings of this study also revealed that women mostly performed self medication (9, 12, 15, 16, 19, 22, 44, 47, 71) compared to men and only in one publication the number of self medicators was higher amongst men (5).

Having health insurance coverage was discussed in 7 included reports among them in 6 studies the study respondents had not any health insurance

(15, 40, 45, 47, 57, 63) and one study reported that the studied sample had a kind of health insurance (38). Due to the observed methodological heterogeneity of the included studies in this systematic review including the studies' target group, the applied data collection tools and reported prevalence of self medication no further statistical analysis was done on the data retrieved.

Table 7: Reported types of drugs applied by the self medicators in the retrieved publications

Types of drugs	Number of reporting publications
Analgesics	14 (11, 21, 29, 34, 36, 38, 40, 41, 43, 48, 45, 47, 55, 68, 70)
Anti-infection	12 (17, 21, 28, 29, 36, 38, 43, 45, 47, 67, 68, 70)
Anti fever	5 (11, 36, 41, 43, 71)
Anti cough	5 (17, 29, 38, 41, 70)
Gastrointestinal drugs	5 (21, 36, 43, 45, 50)
Psychotropics and anti-depressants	3 (34, 38, 45)
Cardiovascular drugs	3 (17, 29, 50)
Anti diarrhea	2 (17, 36)
Anti rheumatoid	2 (34, 67)
ENT drops	2 (29,43)
Skin drugs	1 (34)
Anti malaria	1 (28)

Discussion

The review showed that regardless of the type of studied samples (driven from general population or selected sub-groups of population) the reported prevalence of self medication in about 53.8% of the studies was higher than 50%. Therefore, high prevalence of self medication seems to be a health challenge in many countries of the world.

Low perceived seriousness of disease, lack of sufficient time to visit a physician, easy purchase of medications, having experience of good results from previous self medication and high costs of visiting a professional health care provider were among the most frequently reported factors to adopt self medication behavior.

The study findings also indicated that self medication was more prevalent in developing countries than the developed world. Receiving un-professional advice from family members, relatives and friends about efficacy of several drugs to treat different diseases in most of the recruited studies were the main sources of information for those who preferred to treat themselves. Pharmacies, friends and stored drugs at home were indicated

to be the main source of drug supply for the study respondents in the retrieved publications. Analgesics and anti infection drugs were shown to be the most frequently applied drugs for self medication. The results are consistent with the findings of several individual studies (2, 4-8, 12, 15-19, 22, 28, 29, 31, 36, 37, 38, 40, 46, 47, 51-53, 58, 60, 62, 70-72) on general populations. However, the observed differences among findings of this study with the results of individual studies could mostly represent the inherent differences in the applied methodological methods in the conducted research rather than authentic divergences in the influencing factors of self medication among different populations. This speculation is concurrent with the findings of several studies that indicated heterogeneity in the methodologies used in studies on Iranians and also reporting inadequacies especially in research evidence published in Iran (73-75).

As far as we are aware, this systematic review is the first review on the precipitating factors of self medication both in general and selected samples of populations. While we tried to follow steps of a standard protocol in conducting this systematic review, the possibility of selection bias should not

be rolled out completely. Lack of access to some of the popular databases in the field, lack of time to examine all routes to find relevant publications (cross referencing) and to probe further for unpublished research reports were main limitations in our attempt to shed light on precipitating factors of self medication behavior.

To lower the current extent of self medication in different populations, we need more focus on all above discussed aspects of the behavior. Blaming people for their adopted treatment option without eliminating current hassles they encounter in accessing health care will not lead to a major change in practice.

Conclusion

There is a considerable heterogeneity in the methodology and findings of the studies that have focused on self medication behavior. The wide range of the reported prevalence of self medication among different communities and subgroups of populations represents both methodological challenges we have in practicing evidence based research approach and also practical challenges in controlling the interrelated factors that may lead to self medication behavior. The identified factors can be categorized into contextual factors (education level and economic conditions in communities, etc), health care systems related factors (current policies to sell non OTC drugs, pursuing of standard protocols in prescribing drugs, etc) and individual factors (knowledge of people, their attitudes towards diseases, etc). Without a comprehensive approach to intervene and amend these triggering determinants of self medication practice, scattered efforts will create scattered results. The study finding implied that improvement in service quality of health care may be more beneficial than the measures were taken hitherto. Future studies must focus on examining subjective and objective barriers that may exist in front of establishing the required but nonexistent harmony amongst all stakeholders of health systems to diminish the scale of the problem.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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The authors declare that there is no conflict of interest in doing this study.

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