



PROMOTING SAFE USE OF OVER-THE-COUNTER MEDICATIONS AMONG ADULTS IN FINLAND

A LITERATURE REVIEW

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2020 Laurea

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Abstract

Over the counter medications (OTC) are drugs bought in any pharmacies or online drug stores which are not prescribed by medical professionals, also known as self-medication or non-prescription drugs.

The purpose of this study is to describe the safe use of over-the-counter medications among adults, identify the challenges associated with safe use and patient safety in Finland. The aim is to increase awareness about OTC medication misuse and to suggest strategies that can be used to promote the safe use of OTC medications

A literature review was chosen as the research method. Scholarly and academic journal were collected through electronic literature search conducted in five main databases namely, ProQuest Central, CINAHL, Elsevier(ScienceDirect), Google Scholar and Google search. Six articles were then chosen for a thorough review. The results of these articles were analysed with the inductive content analysis method. The results have demonstrated that otc medication can be promoted safely by executing over-the-counter safety practices, patient counselling and OTC medication awareness. Most OTC medication misused in Finland include ibuprofen, acetylsalicylic acid (ASA) or aspirin, paracetamol, ketoprofen, potassium chloride, and naproxen. OTC medications misused among Finnish adults resulted to drug interactions, lack of knowledge about OTC medication use and unsolicited advice from other people and online.

Keywords: Over-the-counter (OTC) medications, non-prescription drugs, misuse, safe use, self-care, self-medication.

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In the past few years, patient safety has been considered as the top priority of public health care and the growing number in the area of health services and policy research (Donaldson, 2009). Over-the-counter (OTC) medications are considered to be safe medications opposite to prescribed and illegal medications, but misuse is increasingly being observed (Cooper, 2013). One of the agencies, particularly in Finland, who is assigned to monitor misuse and regulate OTC medications in the market is Fimea. According to the Ministry of Social Affairs and Health, Finnish Medicines Agency (Fimea) is responsible for marketing authorisations in the events that the recognition procedure, distribution procedure or national procedures are questionable. Also, Fimea controls the sale of medications and which roles are regulated by act and degree.

The functions of Fimea are improving the health of the people by controlling medicinal, tissue and blood products and improving the pharmaceutical factors (Levanen and Gurung, 2011). It is the Fimea's aim to improve the people of Finland's pharmaceutical service, enhance the safety, appropriateness and economy of the distribution of medicines.

In 2013, the most prominent groups of non-prescribed drugs with a percentage of 18% were nicotine replacement therapy, 16% were medications for the gastrointestinal tract, analgesics (15%), 14% for colds and coughs and other medications for respiratory system, 9% were medications for the circulatory system, 7% for vitamins and trace elements and the least groups were antiallergics with 4% (Fimea, 2015). During the 2000s, consumption of OTC medications went up by nearly 50% while wholesale reached up to estimated 155 million euros and for approximately 228 million euros in 2013 (Fimea, 2015). According to national statistics made by Fimea in 2013, 50% of consumers had used OTC medications during the week, and one out of ten Finnish adult uses them every day. Moreover, at this point, Finnish OTC medications are usually designated in the self-service area like pharmacies, where a pharmacist is ready for counselling. However, it is allowed to buy OTC medication from a cashier without the counsel of a pharmacist in the event of urgency like rush hours or if a consumer hesitated to ask pharmaceutical advice (Ylä-Rautio, Siissalo & Leikola, 2020).

A new OTC medication category has been approved by Fimea in 2015 which requires more advice when buying OTC medications (Rytilä, 2015). A survey with 1028 respondents made by Orion revealed that 70 percent of Finns from 15 years old to 80 years old said that it is a great idea if there will be many medications in the pharmacies without prescription but with the guide of a pharmacist. Also, the survey resulted that Finns want OTC medications for the treatment of migraines, menstrual pain, eye infections and urinary tract infections. The said guidance by the pharmacists will also help consumers to be aware of the risks of self-medicating (Rytilä, 2015).

Self-medication is the treatment of common health issues with medicines which are intended for use with non-prescription of health professionals and authorised as safe and effective. Self-medication is a vital part of self-care that is important in a generation of growing chronic diseases and well-informed health care clients (International Council of Nurses or ICN and World Self-Medication Industry or WSMI, 2012). However, the threats regarding OTC medications are often being overlooked by patients, and the improper use of some medications can result in patient danger (Ylä-Rautio, Siissalo & Leikola 2020).

According to observation and experience, limited evidence is accessible about OTC medications use and misuse in European countries (Barrenberg & Garbe, 2015). Cooper (2013) also concluded that OTC medication misuse is a serious issue in many parts of the world but is still incompletely understood, and research is needed to evaluate interventions to capture individual experiences.

2 Definition of concepts

2.1 Over-the-counter medications

Over-the-counter (OTC) pharmaceutical medications are termed as safe without prescriptions and opposite to unlawful drugs, but misuse and drug dependence is increasingly known (Cooper, 2015). According to the American Academy of Family Physicians (2009), OTC medications are usually used to have a remedy for symptoms like pain, cough, allergies, and flu. And, like any other drug or medications, OTC medicines also can cause adverse effects and danger if not consumed properly (American Academy of Family Physicians, 2009).

2.2 Self-medication

ICN/WSMI Statement (2012) stated that self-medication is the treatment of common health issues with medications especially termed for use without medical prescriptions, and authorized as safe and effective. Also, it has been mentioned that self-medication is a vital part of self-care that is specifically relevant in an era of increasing typical attitudes towards OTC medications and well-informed health care customers. Promotion of reliable self-medication is a significant and underused resource for health and gives opportunity for collaboration and consultation among patients and healthcare professionals (ICN/WSMI Statement , 2012).

2.3 Misuse

Improper use of over-the-counter medications can be called as medication “misuse”. Misuse is the inappropriate use of OTC medication for a known medical issue (Pharmacy Network, 2016). It is difficult to know the scope of the issue of OTC medication misuse and a lot of studies conclude

the most of the community pharmacists recognize that misuse happens (Pharmacy Network, 2016). In this study, the researchers will be using the word “misuse” when referring to the improper use of OTC medications.

According to Pharmacy Magazine, OTC medication consumers misuse over-the-counter medications for a lot of reasons. It includes inappropriate medical use, medication dependence, attempt to change body shape, unintentional misuse, deliberate abuse for non-medical reasons (like using decongestants to increase alertness), and to facilitate the use of illicit substances (Pharmacy Network, 2016).

2.4 Safe use

This study will address only the promotion of OTC medication’s safe use in the healthcare system. Over-the-counter medicines (OTC) can be considered as harmful as prescribed medications if not properly consumed. Hence, the safe use of OTC medications is essential (Consumer health care products association, 2010).

Inappropriate medication uses are one of the major types of malpractice that happen in medical institutions (Choo, Hutchinson & Bucknall, 2010).

2.5 Self-care

This is the capability of encouraging everyone to have good health, avoid diseases, and to adjust with conditions with or without the consultation from a medical professional (WHO, 2020). While Fimea (2018) stated that in accordance with the Finnish pharmaceutical policy, self-care should always be a priority in health care. This will need integration between health care services and pharmacies. And, that health care professionals including doctors and nurses should be aware of OTC medications and with ways on how the pharmacy give counsel on self-care.

According to the Ministry of Social Affairs and Health (2011), care procedures, medication choice and guidance should be synchronized in pharmacies and hospitals. And, it is important that all the concerned healthcare professionals should be mindful of what OTC medications are being used by the patient (Fimea,2018).

3 Purpose of the study and Research Questions

3.1 Purpose of the study

The purpose of this study is to describe the safe use of OTC medication among adults, identify the challenges associated with OTC medication use in Finland. This study aims to increase awareness about OTC medication misuse and to suggest strategies that can be used to promote the safe use of OTC medications.

3.2 The research questions

1. How is OTC medication safe use being promoted to Finnish adults?
2. What are the commonly misused OTC medications in Finland?
3. How OTC medications are being misused by adults in Finland?

4 Methods

4.1 Literature review as methodology

The research method for this study is literature review. Aveyard (2010) said that a literature review is the comprehensive study and interpretation of literature that relates to a certain topic. In doing a literature review, the researchers identify a question then searches to answer this question by seeking for and studying important literature using a systematic approach (Aveyard, 2010). Collecting ideas on a certain topic is important because there is a vast amount of literature available to health and social care workers, which cannot be expected that all inputs can be read and appreciated (Aveyard, 2010). All workers who work within health and social care has a professional obligation to be informed with recent developments regarding with the service that they provide (Aveyard, 2010).

Considering the main research question (“How is OTC medication safe use being promoted to Finnish adults?”) and the general objective of the research (“determining strategies to reduce misuse among Finnish adults ”), the researchers will synthesize the articles by integrating them and identify the conclusion that can be drawn from the articles as a group (Knopf 2015). A literature review can combine results from different published studies to address the research questions by interpreting them. It is concluded that it is important to evaluate many different studies to come up with a reliable conclusion from them, it is too risky for researchers to draw a conclusion from one study only (Knopf 2015).

4.2 Inclusion and exclusion criteria

According to Salkind Neil (2010), the inclusion criteria is a set of predefined criteria that are used to determine subjects or topics which will be considered in a research while exclusion criteria is a set of predefined criteria which will not be considered in a research piece of work.

After through screening using inclusion and exclusion criteria, 5 articles will be included in the review (Aveyard, 2010)

The literature selection process is illustrated in the figure 1 below.

Figure 1. Literature Selection Process

Total hit of the articles with preliminary criteria (n = 3024) (articles/journals/research studies published from year 2010-2020 and written in English)				
EBSCO(CINAHL)	ProQuest Central	Elsevier	Google Scholar	Google Search
Inclusion Criteria		Exclusion Criteria		
-Articles published between 2010-2020. -Articles written in English language. -Adult -Finland		-The articles published before year 2010 -Articles not in English -The articles that are not for free. - Not academically written n = 2706 (excluded on the screening)		
(Articles whose abstracts and titles were reviewed) (Articles Screened)n = 319				
(Modify: year 2000-2020 for further search) (articles/journals/research studies published from the year 2000-2020 and written in English language Total hit of the articles with final criteria (n = 3502)				
Inclusion Criteria		Exclusion Criteria		
-Articles published between 2000-2020 -Articles written in English language. -Adult -Finland		-The articles published before the year 2000. -Articles not in English. -The articles that are not for free. - Not academically written n = 3136 (excluded on the screening)		
Articles reviewed further n= 366 Final Step of Screening				
Inclusion criteria		Exclusion criteria		
-Articles which answer research questions N= 5		- The target group is not adult, N =23 - Duplicate, N =18 - Not Finland, N =152 - Not relevant to search topic, N = 121 - Article which do not answer research questions, N = 47		
The final list of articles that meet inclusion criteria n = 5				

4.3 Information retrieval

A computer database retrieval was performed to search for relevant information in an organized procedure, by gathering information from journals, academic articles, published research studies, and other research documents that had already been previously published from Laurea library search interface, LAUREA FINNA (Aveyard, 2010). This is a portal for students for all Laurea's printed and electronic collections which are relevant to any thesis work (Laurea LibGuides, 2020). The authors are interested in the electronic collections which contain professional literature based on the medical field of study where an electronic literature search will be conducted in five main databases namely, ProQuest Central, CINAHL, Elsevier(ScienceDirect), Google scholar & Google search these were found to have significant information that would answer the research questions (Aveyard 2010; Laurea LibGuides, 2020).

Key words used in the searches were, "safe use," "misuse" "over the counter medication" "non-prescription drug" "self-medication" "adults" and "Finland" which were combined in different ways with the Boolean operator "and" and "or." Key words chosen were approved by the thesis adviser. The data search was conducted in June 2020 (Laurea LibGuides, 2020).

The first database available online in Laurea library was Proquest central is available for researchers who may need to look for information for their thesis. The authors are interested in the health and medical professional literature. In the initial search the articles that were found using keywords: "safe use," "misuse," "over the counter medication," "non-prescription drug," and "self-medication," with these limitations: scholarly journals, full text, had to be in English language, dated between June 2010-June 2020, Europe, all adults, resulted to 257 hits. (Laurea Libguides 2017).

The second database that was considered in the primary search was CINAHL. CINAHL is the abbreviation for Cumulative Index to Nursing and Allied Health Literature. It has a variety of medical journals, publications and the literature has an immense knowledge for health care. In the primary search using the keywords: "safe use," "misuse," "over the counter medication," "non-prescription drug," "self-medication," and using advance search option by selecting academic journals, full text, all adults, June 2010-June 2020, continental Europe, the articles that were found resulted to 74 hits. (Laurea Libguides 2017).

The third database used was Elsevier which is a database in Laurea Finna with articles which are open access. The open access journals are peer-reviewed and free to use to increase accessibility. From Elsevier the researchers obtained 189 article on our initial search that used the key words "safe use," "misuse," "over the counter medication," "non-prescription drug," "self-medication," "adult" and "Finland" with limitations such as: Review and research articles (Laurea Libguides 2017).

The fourth database used was a Google Scholar using the key words: “safe use,” “misuse,” “over the counter medication,” “non-prescription drug,” “self-medication,” “adult” and “Finland” with limitations: 2010-2020 and english which yielded to 664 results (0.10sec).

While the fifth database from Google Search, keywords used were “safe use,” “misuse,” “over the counter medication,” “non-prescription drug,” “self-medication,” “adult” and “Finland” resulted in 1840 hits (0.63 seconds) and reviewed both the title and abstract which may be relevant to the study. The researchers found a very significant source of literature review for the study from the Google search but was published in 2000 and fell into one of the exclusion criteria. A numerous researchers/authors have used the study of Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E. (2000) which is “Frequency of daily over-the-counter drug use and potential clinically significant over-the-counter prescription drug interactions in the Finnish adult population” as a review source related to OTC drugs and self-medication like Debrincat, M. (2015) entitled “Patient perspectives to self medication - community pharmacy” and “Drug-related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk over the counter medications by Ylä-Rautio, H., Siissalo, S. & Leikola, S. (2020) which was also admitted as part of the researcher’s literature search. Also, Their research works were not only known in Finland but in another country as well. An article published in the European Journal of Clinical Pharmacology (2015) about the use of over the counter drugs and safety concerns in OTC drugs in Estonia (2014) are some of what the researcher has reviewed (Aveyard 2010); Laurea Libguides 2017).

A further modification was done again and considered as “second and last screening” because the researchers would like to know if there will be more studies similar with Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E. (2000) which may be relevant also to the study. The publication date was filtered in the year 2000-2020 and resulted 310 hits from Proquest central, 97 hits from CINAHL, 302 hits from Elsevier, 953 results (0.15sec) from Google Scholar and Google search resulted in 1840 hits. From the further modification and by again reviewing the title, abstract, of each article, the researchers were able to find the exceptional research of Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E. (2000) again in Proquest central which was previously found in Manual search but didn’t get more studies which has the same relevance with Sihvo, S. et. al. (Aveyard 2010, Laurea Libguides, 2017).

The initial search illustrated in table 1, collected a total of 3502 articles from all the databases, using the keywords “safe use,” “misuse,” “over the counter medication,” “non-prescription drug,” “self-medication,” “adult” and “Finland”. 1st and last screening was done using the advanced search, and filter option which yielded a total of 3024 hits for the 1st screening and 3502 hits for the last screening. After through screening, 2 articles remained in ProQuest central, and 1 in Google Scholar. Also, 2 articles were admitted through Google Search. In total, 5 articles will be included in the review (Aveyard, 2010).

Databases	Limits (First Screen- ing)	Results	Limits (Last Screen- ing)	Results	Approved to ab- stract OR title (First Screening)	Approved to abstract OR title (Last Screening)	Admitted
EBSCO (CINAHL)	Academic Journals Full text English All adults June 2010-June 2020 Continen- tal Europe	74	Academ- ic jour- nals Full text English All adults June 2000- June 2020 Con- tinenal Europe	97	8	12	0
ProQuest Central	Scholarly Journals Full text English June 2010-June 2020 Europe All adults	257	Scholarly journals Full text English All adults June 2000- June 2020 Europe	310	23	27	2 Title: National OTC Medicines Pro- gramme Published: 1/2015 By Fimea Title: Frequency of daily otc drug use and potential clinically significant otc pre- scription drug inter- actions in the Finnish adult population Author: Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E. Published: 2000
Elsevier	2010-2020 Review and re- search articles Adult Finland	189	2000- 2020 Review and re- search articles Adult Finland	302	21	23	0

Google Scholar	2010-2020 English Finland Adult	664 results (0,10sec)	2000-2020 English Finland Adult	953 results (0.15sec)	89	127	1 Title: Drug - related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk over the counter medications Author: Ylä-Rautio, H., Siissalo, S. & Leikola, S. Published Feb 20, 2020
	First & Last screening						
Google Search	Adult Finland	1840 (0.63 Seconds)		1840	178	177	2 Title: Acceptance and use of online pharmacies and the online customer journey for the purchase of OTC medicines Author: Kirsi Punakivi, Master's thesis Published: Helsinki 2019 Title: Identifying over the counter high-risk medications: development of a national high-risk medication list Author: Ylä-Rautio, H., Schepel, L., Koskinen, T., Salimäki, J., Sandler, C. & Holmström, A. Published: 2017
TOTAL		3024		3502	319	366	5

Table 1. Illustration of the data search process.

4.4 Data appraisal

The critical appraisal phase tests the strengths, limitations, and importance of the literature being examined using sets of guidelines (Aveyard, 2010). Among the included five articles, three articles used qualitative method, one used quantitative method, and one article used both quantitative and qualitative study method. The tool for appraisal used in this essay is CASP tool for systematic literature review (Critical Appraisal Skills Programme 2018).

The main purpose of CASP is to assist the researchers to give required skills for finding and critically evaluating the best scientific evidence on which health care studies can get their conclusions (CASP, 2018). This tool was founded in Oxford in the year 1993 and has since assisted to develop an evidence based in medical and social care, working with local, national and international organization partners (CASP, 2018).

The researchers adopted Critical Appraisal Skills Programme(CASP) 2018 by downloading the CASP application online as the tool of appraisal since it was the most ideal in validating of the literature review articles(CASP, 2018). This contains a checklist consisting of 10 questions which can be answerable by “yes”, “no”, or “can’t tell”. It does not contain a scoring system and the chosen articles are rated in terms of ‘Good’ , ‘Fair’ , or ‘Poor’(CASP, 2018.). The researchers read the 10 questions of evaluating the articles, answered each question and rated each article following the steps that had been set in the CASP tool. Comments were also included for articles which didn’t satisfy some of the items in the checklist and wrote none if all the categories have been satisfied. (CASP, 2018.) After the appraisal, 5 articles were evaluated as good and can be found in Appendix 1.

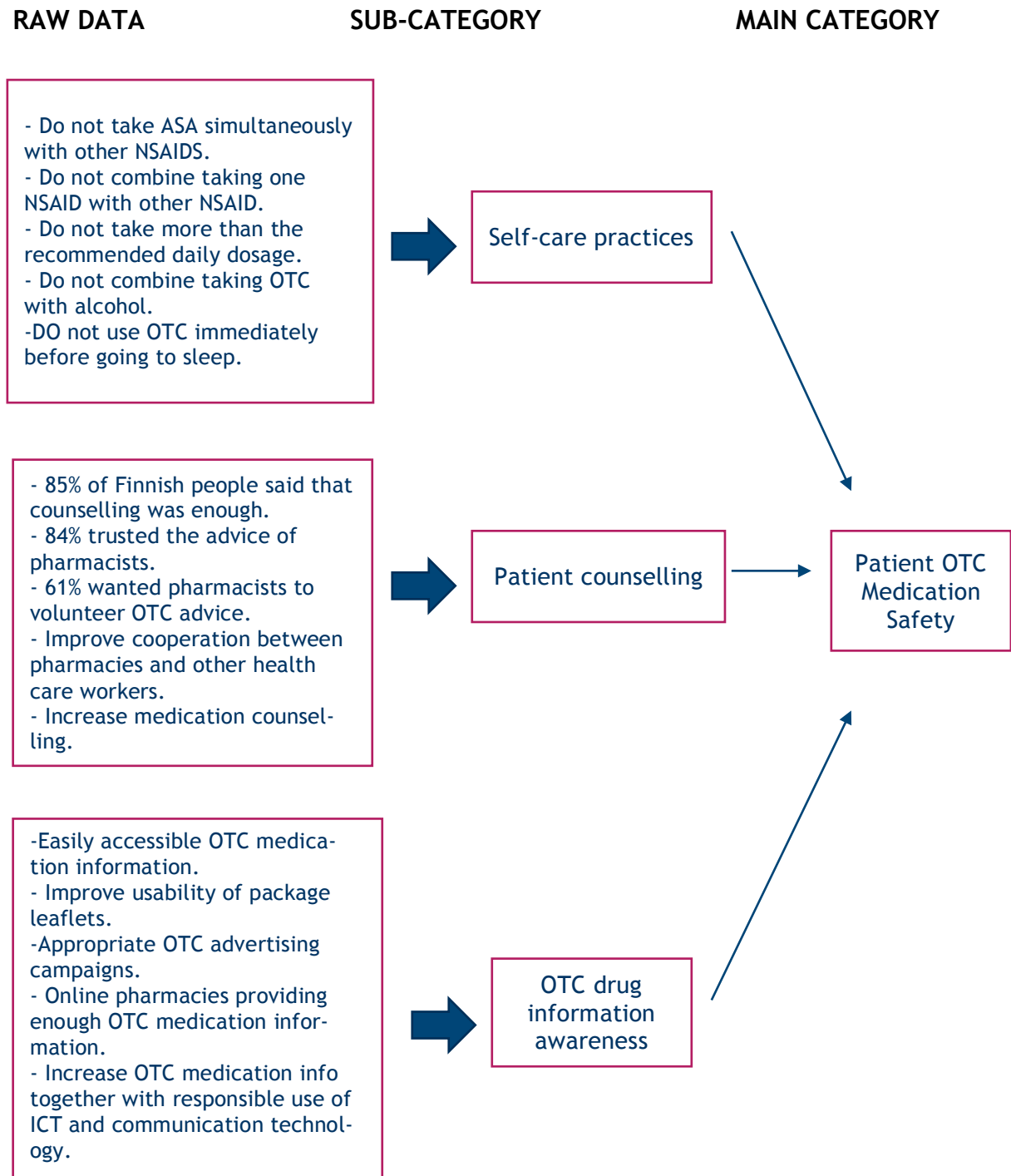
4.5 Data Analysis

The researchers will be using the inductive content-analysis approach as this type of analysis is used to integrate the results of the collected studies. “Inductive analysis is a systematic procedure for analyzing data specifically qualitative data which is guided by evaluating the objectives. It involves detailed reading of articles to derive concept themes by interpreting the collected articles (Thomas, David R. 2006).

The authors of this study will use the inductive content analysis which aims at reducing bulk information or several materials into more organized data from which the researchers can determine a particular pattern in order to gain more ideas. In this type of analysis, the authors will initially organize collected data from literature reviewed materials by making notes and small headings. The data is then grouped by combining similar headings into sub categories and then through grouping of similar subcategories to form main classifications. This is a tiresome process that involves a lot of reading and re-reading in order to group common data together to come up with a more specific format (Polit & Beck 2012). The researchers took notes from raw data and collected

same heading into categories. The authors took notes from raw data and grouped similar headings into categories as illustrated in Figure 3.

Figure 3. Data analysis process (Polit & Beck 2012).



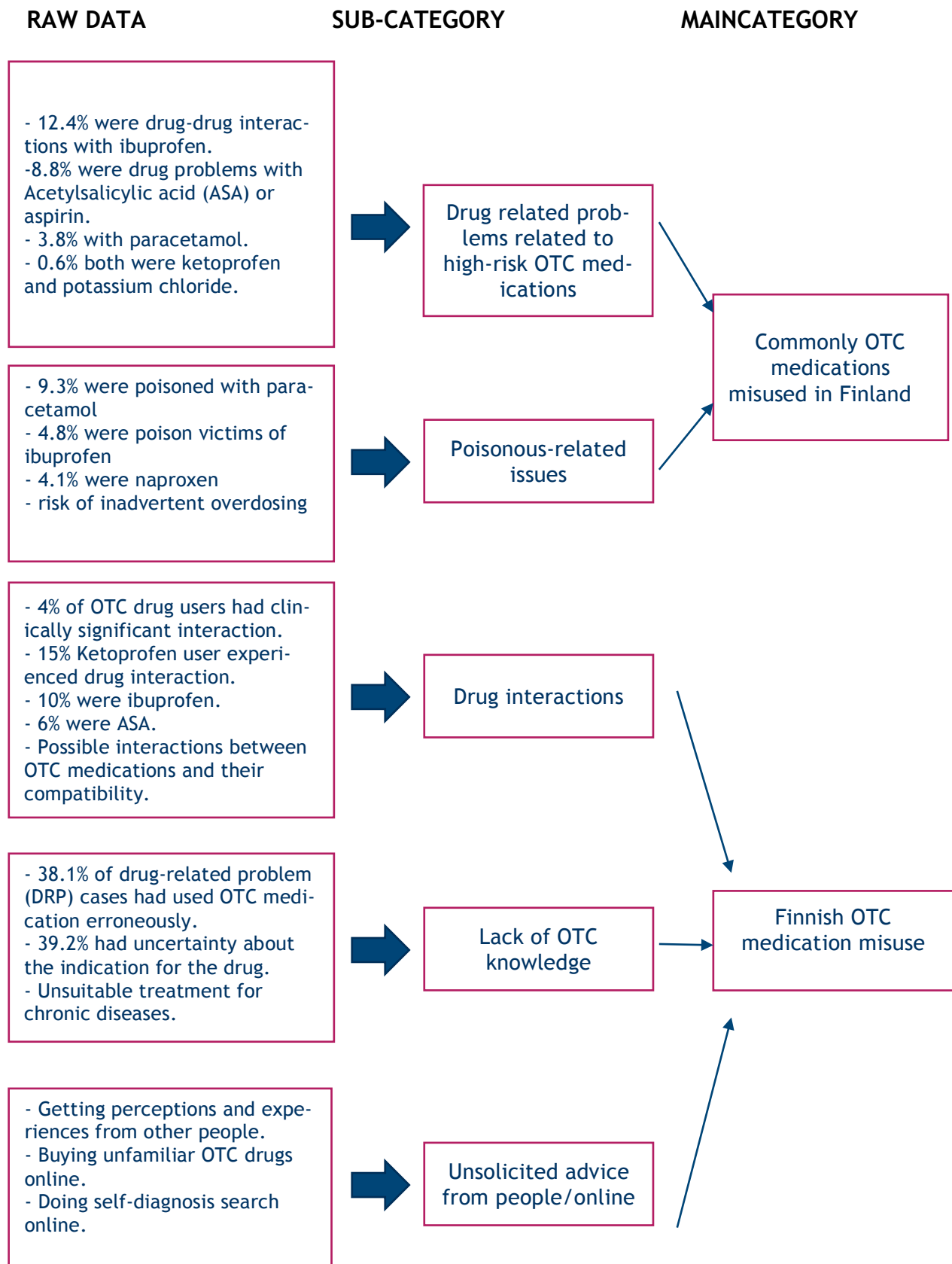
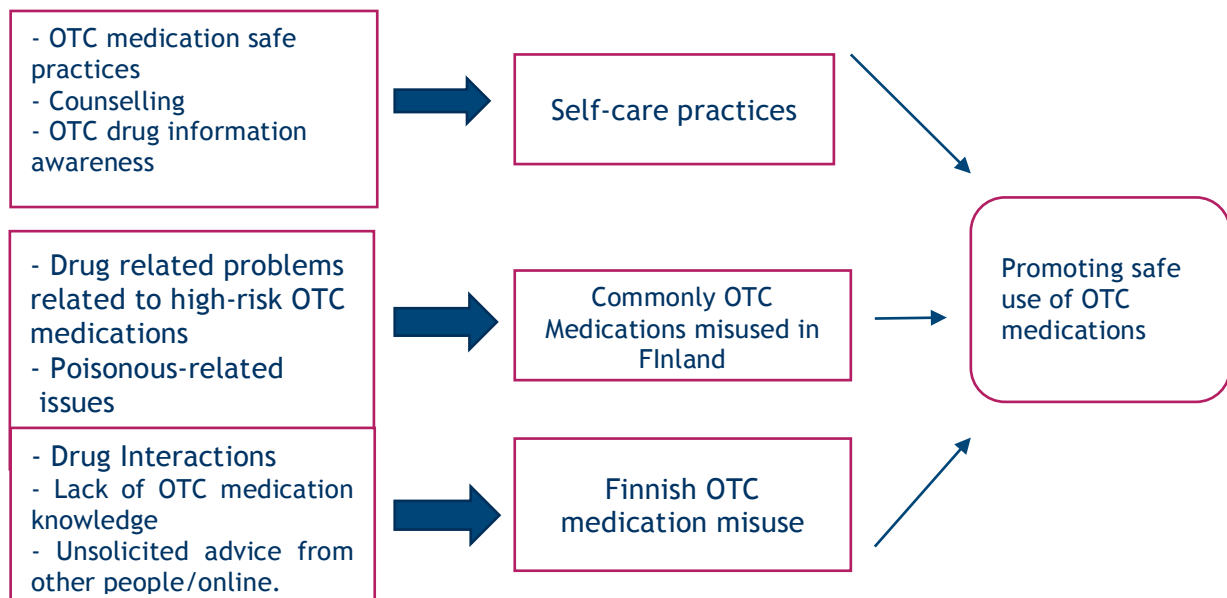


Figure 3 presents the findings in this thesis that were reviewed and organized by grouping common data together to come up with a common theme (Polit & Beck 2012). Five research articles were reviewed from literature reviews related to the purpose of this thesis. Based from the findings, eight sub-categories (Figure 4) were identified throughout the inductive content analysis to answer the three research questions. The first main category will answer Research Question 1(RQ1): How is OTC medication safe use being promoted to Finnish adults?, which resulted in patient OTC medication self-care practices. Secondly, the second main category for commonly OTC medications misused in Finland will answer Research Question 2(RQ2): And lastly, Finnish OTC medication misuse as the third main category will answer Research Question 3(RQ3): How OTC medications are being misused by adults in Finland? All the three answered research questions will serve the purpose of the thesis which is to describe the safe use of OTC medication among adults, identify the challenges associated with OTC medication use in Finland.

Promoting safe use of OTC medication divided into three categories such as self-care practices, Commonly OTC medication misused in Finland and lastly the Finnish OTC medication misuse.

Figure 4. Summary of findings (Polit & Beck 2012).



5.1 Self-care practices (RQ1)

The analysis of the evidences from the literature reviewed suggested that: any OTC medication selection and use for the promotion of safer self-medication should start from being aware with the risks and counselling should be executed properly to OTC medication consumers (Ylä-Rautio, H., Schepel, L., Koskinen, T., Salimäki, J., Sandler, C. & Holmström, A., 2017).

5.1.1 OTC safe practices

It has always been considered that OTC medication use is safe but can cause patient harm especially adults who are more at risk. OTC medication high-risk list was developed to identify patients who are at risk and listed some recommendations to address patient harm (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020). By using a set of questions, recommendations have been listed which include the following: avoiding simultaneously use of ASA with other NSAIDs and that antithrombotic ASA should be given 2 hours before other NSAIDs, avoid OTC drug overdosing by checking the recommended daily dose, using paracetamol/acetaminophen with alcohol should be avoided, and do not take potassium chloride before sleeping (Ylä-Rautio, H., Schepel, L., Koskinen, T., Salimäki, J., Sandler, C. & Holmström, A., 2017).

5.1.2 Patient Counselling

Pharmaceutical system together with the other health care workers should be working together in monitoring and counselling OTC medication use. One of the roles of pharmacist and other health care workers are health promotion such as promoting self-care practices, advice and counselling but the appropriate use of OTC medications and responsibility of its selection lies with the consumers (FIMEA, 2015).

According to FIMEA (2015), counselling should be implemented by the pharmaceutical expertise in any pharmacy though OTC medication doesn't require the prescription of a physician. From the survey made in 2013, most of the results (89%) viewed that the pharmaceutical services regarding OTC medication counselling was enough, 84% said that they believed pharmaceutical counselling, and that pharmacists should volunteer advice on OTC medication use with 61%. The results only prove that it is very significant that medication counselling be implemented. Pharmacies and other medical or health care workers should increase their participation in monitoring and counselling OTC medications. Also, OTC medication consumers' cooperation should be promoted to address care recommendations (FIMEA, 2015).

5.1.3 OTC drug information awareness

The national medicines information networks should not stop in advancing national cooperation on publicising and improving trusted and available medicine information. It has also been suggested that package leaflet contents be improved to provide OTC medication information clearly and understandable (FIMEA, 2015). The promotion of latest management techniques regarding overall medication of patients, using existing tools should be enhanced with the cooperation of both pharmaceutical and health care professionals. Patients should maintain an updated lists of or their own medications together with their OTC medicines and nutritional supplements. In relation to patient's lists of medications, Kanta patient data management has been improving their services to promote an interface where lists of medications can be obtained with patient's permission (FIMEA, 2015).

Increasing awareness regarding OTC medication information with the availability of ICT and communication technology should not be abused. The evolving information and communication technology encourages OTC medication consumers to be responsible when it comes to their health literacy (FIMEA, 2015).

5.2 Commonly OTC Medications misused in Finland (RQ2)

Inappropriate or misuse of OTC medications can cause health problems that can be prevented by clear, accessible medicine information and counselling (FIMEA, 2015). To support this, majority of the pharmacists agree that OTC medication misuse can cause patient harm and consumers should always ask a pharmacist to assess the needed medication before taking them (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020)

5.2.1 List of Misused OTC Medications

A study was made over 67 pharmacies (6.4% of all Finnish pharmacies) from every part of Finland to know which OTC medications they thought were commonly misused by consumers (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020). The pharmacies gathered on average 6.5% drug-related problems among OTC medication consumers with or without counselling (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020)

A significant percentage of documented issues regarding high-risks OTC medications were associated with NSAIDs (21.8%) with drug-drug interaction with prescribed medications and inappropriate duplication of active ingredient. Moreover, six ASA problems were reported misused without counselling. 3.8% were paracetamol-related problems concerning unintentional overuse. Vitamins and natural drugs resulted in less than 9% of the drug-related issues (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020)

5.2.2 Poison-related issues

In 2013, a survey made including approximately 10000 participants regarding poison exposure to OTC medications. Among the top of the list, 9.3% had poison exposure with paracetamol, 4.8% for poison related issues with ibuprofen and 4.1% with naproxen. Evidences proved that some unnecessary risks issues regarding intentional or inadvertent poisoning (FIMEA, 2015).

5.3 Finnish OTC medication misuse (RQ3)

Inappropriate or misuse of medicines causes health issues and challenges. For this reason, FIMEA stated that when granting OTC medication status, the assigned authorities should consider the risks that can be related to the use of over-the-counter medication including its misuse (FIMEA, 2015). The Finnish OTC medication misused can be divided into three such as: drug interaction, lack of knowledge and unsolicited advice.

5.3.1 Drug interactions

A study made regarding frequency of OTC drug-drug interactions resulted to 4% of OTC medication users had taken drug interaction with medically relevant interactions. 15% had interaction with ketoprofen users, 10% for ibuprofen, and 6% for ASA (Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E., 2000). A number of prescription drugs, long-term conditions and lower education best explained the risks of interactions. Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E., 2000). This literature reported continuous use and possible harm regarding OTC drug interactions occur among OTC medication consumers (Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E., 2000). The responsibility for taking account of possible interactions between medications and their compatibility lies with the consumer because Finnish pharmacies have no access on the OTC consumer's other medication unless the customer will give the necessary information (FIMEA, 2015)

5.3.2 Lack of knowledge about otc medication

In a study made by (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020), 38.1% of the the drug related problems(DRPs) had used the OTC medication erroneously. 85.3 % of OTC medication DRPs indicated that most drug related problems are observed in self-service sections. Among the 52 Finnish pharmacies surveyed with 339 drug-related problems(DRP), the major problem was uncertainty about the indication for the drug which is 39.2%. 26.3% concerned high risk OTC medications, and most of the cases were concerning non-steroidal anti-inflammatory drugs(21.8%). High risks medications including analgesics in which misuse due to OTC medication consumers lack of knowledge can lead to serious consequences (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020).

A lot of cases regarding OTC medication is unsuitable for the treatment of a chronic illness requiring regular medical assistance to detect complications of the illness and for weighing up the treatment strategy (FIMEA, 2015).

5.3.3 Unsolicited advice from other people/online

With the fast evolving improvement with technology, a study was made to identify how they self-medicate themselves and how they accept the introduction to technology (Punakivi, K. 2019). Based from the results, 16.5% had bought OTC medicines online and this is out of convenience and time saving. The internet became the primary source of information before buying and self-diagnosing could be made to the help of the information from the internet (Punakivi, K. 2019). Moreover, perceptions and experiences of important others and advice from the pharmacy workers were considered as relevant in the process of self-diagnosis (Punakivi, K. 2019)

6 Discussion

The purpose of this study is to describe the safe use of over-the-counter medications among adults, identify the challenges associated with safe use and patient safety in Finland. The results have demonstrated that safe use of patient can be promoted by executing over-the-counter safety practices, patient counselling and OTC drug awareness (Ylä-Rautio, H., Schepel, L., Koskinen, T., Salimäki, J., Sandler, C. & Holmström, A., 2017), (Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E., 2000), (FIMEA, 2015). Mostly OTC misused medications include ibuprofen, acetylsalicylic acid (ASA) or aspirin, paracetamol, ketoprofen, potassium chloride, and naproxen (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020), (FIMEA, 2015). While the misuse of OTC medications by Finnish adults resulted to drug interactions, lack of OTC medication knowledge and unsolicited advice from other people and online (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020), (FIMEA, 2015), (Punakivi, K. 2019), (Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E., 2000)

The findings showed that most of the results of the studies are in compliance with the National OTC Programme by FIMEA 2015. The results of this thesis were supported by its policies specially in promoting safety use of OTC medications. FIMEA stated that no new classes of medicines were identified that can fit in OTC care and note that potential risks should not stop the policy in considering OTC medication for self-care (FIMEA, 2015).

One of the challenges with the availability of technology in buying OTC medications online would be its limitations with patient counselling. Emphasis with the increase cooperation of pharmaceutical systems together with the health care professionals in the promotion of patient counselling (FIMEA, 2015).

The availability of OTC medicines has been introduced in Finnish pharmacies but one study reported that there is a limitation especially with the availability of the chat services. Since, FIMEA has been promoting patient counselling, real-time chat service as well as further improvement of

the online services should be observed. In support with online pharmacies should provide adequate information about their products (Punakivi, K. 2019).

In support with Punakivi, K. (2019), the study made by Ylä-Rautio, H., Siissalo, S. & Leikola, S., (2020) reported that pharmacies recognize and should intervene with drug-related risks related to OTC medication. Counseling would also be the top priority to prevent drug-related problems (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020).

As a result of all the OTC misused medications in Finland, as a remarkable portion of DRP found that misuse was mainly related to systematic analgesics which are considered as high-risk medication and that adequate counselling should also be provided (Ylä-Rautio, H., Siissalo, S. & Leikola, S., 2020).

7 Trustworthiness

For proof of trustworthiness, it is expected of the authors to prepare very well in advance before writing a thesis, data gathering, data analysis, comprehensively grouping the gathered data into findings, discussion of the findings, and finally, report on the results of the whole process of the thesis writing (Kääriäne, Pölkki, Utriainen & Kyngäs 2014).

To ensure reliability and credibility of the chosen research articles for inductive content analysis, the Critical Appraisal Programme (CASP) was used. The appraisal programme examined the significance and trustworthiness of the research articles that have been selected for literature review (CASP, 2018). Moreover, the authors made sure to re-read all the five articles a lot of times during the data analysis stage. This was done to avoid misinterpretations or the possibility to omit relevant information and to identify main categories clearly (Polit & Beck 2012).

8 Ethical Considerations

The researchers have ethical and moral responsibilities toward individuals or institutions who are subjects of the research, the research community, the professional field, and society, among others (Arene, n.d.). This thesis has been written by two authors, who participated and deliberated throughout the thesis writing. An author is mainly considered to be a person who has made a relevant intellectual contribution to the study (Fennell 2015). Both authors have been mentioned properly, are both reliable for the research work, and have same privileges into the research work upto the final writing of the thesis. Also, Fennell (2015) concluded that, conflicts of interests may evolve as a result of unprofessional relationships, academic competition, and intellectual passions. Lastly, as the research method used in this study is a literature review, therefore, research permission or individual's informed consent is not required.

9 Limitations and Recommendations

The thesis writing experienced a numerable limitations despite the fact that the authors were able to answer the three research questions and the purpose was also served. The online database searches made by the authors used limited search scope since some articles found in the database search were not accessible and some need to be bought online to have full access. Search was done using library access provided by Laurea. Refining the search for adequate number of search results required fine tuning of the research statements with trial and error. Due to the limited available studies regarding our chosen topic, two screenings were made and one old article has been considered (Laurea LibGuides, 2020).

The thesis was written by two authors thus it was possible to discuss the findings and have same views to the study. Among the five articles, one is quantitative, the other is mixed, and the rests are qualitative. Although the appraisal tool has been used to verify each article's credibility, again due to the limited academic experiences, and no scoring applied in that tool, how rightness to use the tool to assess those data is questionnanble but we think enough resources could help us find all the necessary information (Aveyard, 2010).

For further study, it would be interesting to compare the results based on different countries in the promotion of OTC medication safe use . This would help to verify the results of these findings in a different setting and eventually be useful in self-care and promotion of OTC medication safe use. Also, the authors are interested to know how OTC medications are being misused by Finnish children.

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Ylä-Rautio, H., Siissalo, S. & Leikola, S. (2020). Drug-related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk over-the-counter medications. *International Journal of Clinical Pharmacy*.

11 Appendices

Appendix 1. Illustration of data appraisal process.....	27
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Appendix 1. Illustration of data appraisal process

ARTICLE	TYPE OF STUDY	GUIDELINE USED	QUALITY RATING	COMMENT
Ylä-Rautio, H., Siisalo, S. & Leikola, S. (2020). Drug-related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk over-the-counter medications.	Qualitative method	CASP	Good	None
Sihvo, S., Klaukka, T., Martikainen, J. & Hemminki, E. (2000). Frequency of daily over-the-counter drug use and potential clinically significant over-the-counter-prescription drug interactions in the Finnish adult population.	Quantitative	CASP	Good	None
Fimea (2015) National OTC Medicines Programme	Qualitative	CASP	Good	None
Punakivi, Kirsi (2019). Acceptance and use of online	Mixed Method	CASP	Good	None

pharmacies and the online customer journey for the purchase of OTC medicines.				
Ylä-Rautio, H., Schepel, L., Koskinen, T., Salimäki, J., Sandler, C. & Holmström, A. (2017). Identifying over-the-counter high-risk medications: development of a national high risk medication list.	Qualitative	CASP	Good	None
Total: 5 articles				

Appendix 2. Casp data appraisal tool

Drug-related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk OTC medications

Qualitative Study

10.1007/s11096-020-00984-8

Not specified. Not specified 2020-07-21 09:50:14 +0000

A/ ARE THE RESULTS OF THE STUDY VALID?

1. Was there a clear statement of the aims of the research?	Yes / Good
---	------------

2. Is a qualitative methodology appropriate?	Yes / Good
--	------------

3. Was the research design appropriate to address the aims of the research?	Yes / Good
---	------------

4. Was the recruitment strategy appropriate to the aims of the research?	Yes / Good
--	------------

5. Were the data collected in a way that addressed the research issue?	Yes / Good
--	------------

6. Has the relationship between researcher and participants been adequately considered?	Yes / Good
---	------------

7. Have ethical issues been taken into consideration?	Yes / Good
---	------------

B/ IMPORTANT RESULTS?

8. Was the data analysis sufficiently rigorous?	Yes / Good
---	------------

9. Is there a clear statement of findings?	Yes / Good
--	------------

Critical Appraisal: Drug-related problems and pharmacy interventions in non-prescription medication, with a focus on high-risk OTC medications. Page 1

10.1007/s11096-020-00984-8

Not specified. Not specified 2020-07-21 09:50:14 +0000

C/ WILL THE RESULTS HELP ME LOCALLY?

10. How valuable is the research?

Yes / Good

Comments

None

CASP Information

10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a qualitative research:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

The 10 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

There will not be time in the small groups to answer them all in detail!

The 12 questions are adapted from: Drummond MF, Stoddart GL, Torrance GW. Methods for the economic evaluation of health care programmes. Oxford: Oxford University Press, 1987

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Appendix 2.1. Casp data appraisal tool

National OTC Medicines Programme

Qualitative Study

ISBN 978-952-5624-51-9

Not specified. Not specified 2020-07-21 10:05:04 +0000

A/ ARE THE RESULTS OF THE STUDY VALID?

1. Was there a clear statement of the aims of the research?	Yes / Good
---	------------

2. Is a qualitative methodology appropriate?	Yes / Good
--	------------

3. Was the research design appropriate to address the aims of the research?	Yes / Good
---	------------

4. Was the recruitment strategy appropriate to the aims of the research?	Yes / Good
--	------------

5. Were the data collected in a way that addressed the research issue?	Yes / Good
--	------------

6. Has the relationship between researcher and participants been adequately considered?	Yes / Good
---	------------

7. Have ethical issues been taken into consideration?	Yes / Good
---	------------

B/ IMPORTANT RESULTS?

8. Was the data analysis sufficiently rigorous?	Yes / Good
---	------------

9. Is there a clear statement of findings?	Yes / Good
--	------------

C/ WILL THE RESULTS HELP ME LOCALLY?

10. How valuable is the research?	Yes / Good
-----------------------------------	------------

Critical Appraisal: National OTC Medicines Programme. Page 1

Comments

Comments

ISBN 978-952-5624-51-9

Not specified. Not specified 2020-07-21 10:05:04 +0000

None

CASP Information

10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a qualitative research:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

The 10 questions on the following pages are designed to help you think about these issues systematically.

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There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

There will not be time in the small groups to answer them all in detail!

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Appendix 2.2. Casp data appraisal tool

Frequency of daily OTC drug use and potential clinically significant OTC prescription drug interaction in the Finnish adult population

Cohort Study

10.1007/s002280000145

Not specified. Not specified 2020-07-21 14:21:34 +0000

A/ ARE THE RESULTS OF THE STUDY VALID?

1. Did the study address a clearly focused issue? *Yes / Good*

2. Was the cohort recruited in an acceptable way? *Yes / Good*

3. Was the exposure accurately measured to minimize bias? *Yes / Good*

4. Was the outcome accurately measured to minimize bias? *Yes / Good*

5. A. Have the authors identified all important confounding factors? and B: Have they taken account of the confounding factors in the design and/or analysis? *Yes / Good*

6. Was the follow up of subjects complete and long enough? *Yes / Good*

B/ IMPORTANT RESULTS?

7. What are the results of this study? *Yes / Good*

8. How precise are the results? *Yes / Good*

9. Do you believe the results? *Yes / Good*

C/ WILL THE RESULTS HELP ME LOCALLY?

Critical Appraisal: Frequency of daily OTC drug use and potential clinically significant OTC prescription drug interaction in the Finnish adult population. Page 1

10.1007/s002280000145

Not specified. Not specified 2020-07-21 14:21:34 +0000

10. Can the results be applied to the local population?	Yes / Good
---	------------

11. Do the results of this study fit with other available evidence?	Yes / Good
---	------------

12. What are the implications of this study for practice?	Yes / Good
---	------------

Comments

None

CASP Information

12 questions to help you make sense of cohort study

How to use this appraisal tool

Three broad issues need to be considered when appraising a cohort study:

- Are the results of the trial valid? (Section A)
- What are the results? (Section B)
- Will the results help locally? (Section C)

The 12 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

There will not be time in the small groups to answer them all in detail!

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Appendix 2.3. Casp data appraisal tool

Acceptance and use of online pharmacies and the online customer journey for the purchases of OTC medicines

Qualitative Study

URN:NBN:fi:hulib-201909303556

Not specified. Not specified 2020-07-21 14:20:21 +0000

A/ ARE THE RESULTS OF THE STUDY VALID?

1. Was there a clear statement of the aims of the research? *Yes / Good*

2. Is a qualitative methodology appropriate? *Yes / Good*

3. Was the research design appropriate to address the aims of the research? *Yes / Good*

4. Was the recruitment strategy appropriate to the aims of the research? *Yes / Good*

5. Were the data collected in a way that addressed the research issue? *Yes / Good*

6. Has the relationship between researcher and participants been adequately considered? *Yes / Good*

7. Have ethical issues been taken into consideration? *Yes / Good*

B/ IMPORTANT RESULTS?

8. Was the data analysis sufficiently rigorous? *Yes / Good*

9. Is there a clear statement of findings? *Yes / Good*

C/ WILL THE RESULTS HELP ME LOCALLY?

Critical Appraisal: Acceptance and use of online pharmacies and the online customer journey for the purchases of OTC medicines . Page 1

URN:NBN:fi:hulib-201909303556

Not specified. Not specified 2020-07-21 14:20:21 +0000

10. How valuable is the research?

Yes / Good

Comments

None

CASP Information

10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a qualitative research:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

The 10 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

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Appendix 2.4. Casp data appraisal tool

Identifying over-the-counter high-risk medications: development of a national high-risk medication list

Qualitative Study

Write here the article citation or if you know its PubMedID or DOI touch on the left side of this row to import it from PubMed

Not specified. Not specified 2020-07-21 14:24:40 +0000

A/ ARE THE RESULTS OF THE STUDY VALID?

1. Was there a clear statement of the aims of the research? *Yes / Good*

2. Is a qualitative methodology appropriate? *Yes / Good*

3. Was the research design appropriate to address the aims of the research? *Yes / Good*

4. Was the recruitment strategy appropriate to the aims of the research? *Yes / Good*

5. Were the data collected in a way that addressed the research issue? *Yes / Good*

6. Has the relationship between researcher and participants been adequately considered? *Yes / Good*

7. Have ethical issues been taken into consideration? *Yes / Good*

B/ IMPORTANT RESULTS?

8. Was the data analysis sufficiently rigorous? *Yes / Good*

9. Is there a clear statement of findings? *Yes / Good*

C/ WILL THE RESULTS HELP ME LOCALLY?

Critical Appraisal: Identifying over-the-counter high-risk medications: development of a national high-risk medication list. Page 1

Write here the article citation or if you know its PubMedID or DOI touch on the left side of this row to import it from PubMed

Not specified. Not specified 2020-07-21 14:24:40 +0000

10. How valuable is the research?

Yes / Good

Comments

CASP Information

10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a qualitative research:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

The 10 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

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