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## Over-the-Counter Medication Use, Perceived Safety, and Decision-Making Behaviors in Pregnant Women

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**Key words:** pregnancy, over-the-counter medication, nonprescription, medication use in pregnancy, herbal, vitamin, survey

### Abstract

*The purpose of this study was to determine which over-the-counter (OTC) medications women are using during pregnancy, and to assess patients' perceived safety of these medications. In addition, the decision-making process utilized by pregnant women when choosing OTC drug therapy was explored, including sources of information and recommendation.*

*The subjects included pregnant women 18 years and older. Subjects were solicited as a convenience sample by providing surveys in two urban women's clinic waiting rooms. Of the 61 respondents, 96.3% had used an OTC medication, herbal, or vitamin during their current pregnancy. The most common products included prenatal vitamins, acetaminophen, cough drops, antacids, calcium, vitamin D, and DHA. The majority of women surveyed regarded over-the-counter medications, vitamins, and herbals as "safe, but would talk to a healthcare professional before using." The most utilized sources of drug information during pregnancy were a physician (68.9%), midwife (55.7%), and the Internet (44.3%). There were an equal number of respondents obtaining general OTC information from a pharmacist as from their family and friends (26.2%).*

*Almost all subjects had used an over-the-counter medication during their pregnancy and the majority considered OTCs safe after first consulting a healthcare professional. Although a high percentage of subjects have obtained their information and recommendations from healthcare professionals, a very small proportion of subjects had utilized a pharmacist as a resource. Being drug experts and easily accessible members of the healthcare team, pharmacists have a responsibility to aid the obstetric population in the appropriate and safe use of over-the-counter drugs, vitamins, and herbals during pregnancy.*

### Introduction

Medication use during pregnancy is a topic many pharmacists and other healthcare professionals will be questioned about throughout their careers. In general, it is important to avoid unnecessary drug exposure to the growing fetus as, although rare, fetal harm may result from maternal medication use.<sup>1</sup> For many medications, there is a lack of evidence regarding specific recommendations for use by pregnant women. Avoidance of drug use in pregnancy may not be feasible as many medical conditions left untreated can be more detrimental to the mother and baby than medication therapy to manage the condition. Risks and benefits must be weighed for each individual situation.

Often pregnant women resolve to make decisions on OTC medication use alone. Many people, pregnant mothers included, consider OTC medications safe simply because they are available without a prescription. Another issue arises with

dietary supplement and vitamin use, as these products are often considered "natural" and thus harmless. A few OTC drugs have a proven safety profile for use during pregnancy, while others have unproven safety or are known to adversely affect the fetus.<sup>2,3</sup> In addition, the safety of a certain OTC product may change depending on the gestational age of the baby.

Several studies are present in the literature exploring questions related to drug use during pregnancy. Many focus on prescription drug use, while others include OTCs and herbals.<sup>4,5</sup> A few studies also describe the prevalence of use and its relationship to maternal characteristics, such as age, income, or educational status.<sup>6,7,8</sup> Of note, no article was found that studied a pregnant woman's decision-making process, such as sources of information and recommendations, or her opinion on OTC medication, vitamin, and herbal safety.

Over-the-counter medication use by pregnant women is very common as evidenced by several studies. A study in the *Journal of Obstetrics and Gynecology* (2003) examining prescription, over-the-counter, and herbal medicine use in a rural, obstetric population, found 92.6% self-medicated with at least one OTC product and 45.2% used herbals.<sup>4</sup> In addition, 20.8% took five or more OTC medications during pregnancy. They noted a trend of increased use as pregnancy progressed, especially with acetaminophen, calcium carbonate, cough drops, and guaifenesin. Other common over-the-counter medications used included ibuprofen, aspirin, prenatal vitamins, H<sub>2</sub>-antagonists, and non-sedating antihistamines.

Another primary study focused on the frequency of prescription, OTC, and herbal use, but questioned women immediately postpartum.<sup>5</sup> They found 96.9% had taken at least one medication while pregnant. After excluding prenatal vitamin and iron supplements, they found 62.8% used OTC medications and 4.1% used herbals. Additionally, 33.5% used two or more medications and 13.6% used four or more drugs during their most recent pregnancy.

In a large scale, retrospective study, non-prescription drug use was quantified for more than 10,000 pregnant women.<sup>6</sup> Data was collected from two case-control studies: the Slone Epidemiology Center Birth Defects Study and the National Birth Defects Prevention Study. They found most pregnant women had taken an OTC product, most commonly acetaminophen, pseudoephedrine, diphenhydramine, and guaifenesin. By characterizing drug use before and during pregnancy they discovered a trend of increased use during pregnancy compared to the three months prior. Rates of analgesic and decongestant use were higher for white women, those with at least a high school education, and women who were 20 years and older.

Of particular interest are studies that not only focused on medication use during pregnancy, but also studied the relationship of use to maternal characteristics. In one such study, 54.9% of pregnant subjects used at least one OTC medication, with the most common being analgesics, antacids, and cold/allergy products.<sup>7</sup> The authors determined that women who used prescription medications were more likely to also use OTC medications. In addition, women who were older, white, married, college-educated, and concurrently used caffeine, alcohol, and/or marijuana, took OTC medications more frequently than other groups.

Another study conducted in 1993 found similar results regarding associations between maternal demographics and OTC drug use.<sup>8</sup> Of the 2,752 subjects, 68% used a medication

during pregnancy, with more women using OTCs versus prescription drugs. Women who used OTCs while pregnant were more likely to be older, white, married, have private medical care, be highly educated, and were less likely to live in urban areas.

Within this body of literature, many studies do not solely focus on over-the-counter drug use and some rely on interviews of postpartum women. Several studies quantify the use of OTCs during pregnancy and a few describe associations between OTC use and maternal characteristics. However, no article describes where pregnant women obtain information or professional recommendations regarding OTC medications. Also, no study was found exploring a pregnant women's opinion on the safety of OTCs, herbals, and vitamins.

In summary, few studies are published examining the use and perceived safety of OTC medications during pregnancy and the decision-making process women use. Even fewer studies, if any, mention the impact of this topic on pharmacists. Pharmacists can provide valuable instruction on which over-the-counter medications are known to be safe or should be avoided during pregnancy. They can teach patients that many drugs and herbals available over the counter lack evidence as to their safety and efficacy during pregnancy. Thus, a goal of this study was to gather information related to OTC use, decision-making behaviors, and beliefs in pregnant women and present it in a way that aids pharmacists in providing the best patient care to this population.

### **Purpose**

The primary objective of the study was to determine which over-the-counter medications, including supplements, vitamins, and herbals, women are using during pregnancy. A secondary objective was to assess a pregnant woman's perceived safety of OTC medications, herbals, and vitamins. In addition to this information, the study was designed to assess the decision-making process utilized by pregnant women when choosing over-the-counter medication therapy.

### **Methods**

The authors developed the survey and it was piloted with seven pregnant women to obtain feedback. Necessary revisions to the survey were then made. The survey was not formally validated. The University of Minnesota Institutional Review Board reviewed the study design and determined it to be exempt from review. The cover letter and survey can be found in appendices A and B.

The eligibility criteria included pregnant women 18 years and older of any trimester, race/ethnicity, education, or

background. No comparison group was used. Subjects were solicited as a convenience sample by providing blank surveys with instructions in two urban women's clinics. The locations included the University of Minnesota Physicians Women's Health Center and University Specialists in Women's Health Clinic both at the University of Minnesota Medical Center-Fairview. Informed consent was obtained for each respondent. Pregnant women 18 years and older who successfully completed the entire survey were included in the data analysis. Survey results were compiled and reported using descriptive statistics.

Pregnant patients were asked to participate in the study by women's clinic front desk staff when they presented for their obstetric appointments. The women typically had time to complete the survey while waiting for their appointment. Participants were instructed to not include any identifying information on the survey.

Each survey included a cover letter introducing the researchers, explaining the study purpose, and informing the subject of pertinent instructions. Attached to the cover letter was a five-page survey with questions regarding the subject's specific over-the-counter drug use while pregnant. Women were asked to list any OTC medications they have used during their current pregnancy. In order to obtain the most accurate information, participants were prompted with common conditions treated with over-the-counter drug therapy and a list of examples followed by a space to list their personal use, if any. Subjects were then asked for their opinion on the general safety of OTC medications, herbals, and vitamins during pregnancy using a subjective scale of choices, varying from very safe to unsafe.

Finally respondents were questioned on where they have received their information regarding OTC medication use during pregnancy and who, if anyone, was responsible for recommending OTC products. Possible information sources included friends and family, books/magazines, the Internet, or a healthcare professional, while over-the-counter medication recommendations could come from a specific healthcare professional or be self-prescribed.

### Results

Twenty-one completed surveys were obtained from the University of Minnesota Physicians Women's Health Center and 40 were completed by patients at the University Specialists in Women's Health Clinic for a total of 61 study participants. Demographic data are presented in Table 1. The majority of subjects were Caucasian (59%), between the ages of 26-30 (49%), and in their 2<sup>nd</sup> (44%) or 3<sup>rd</sup> trimester (41%). The highest level of education was most commonly

professional or graduate school (41%). The most frequent household annual income was between \$50,001-\$100,000 (33%).

Table 2 lists all of the over-the-counter medications, herbals, and vitamins taken by the study participants. Medications are grouped by indication with the corresponding percent use out of the total number of respondents. The most common OTC taken by subjects was a prenatal vitamin (88.5%). The next most widespread OTC used was acetaminophen with 67.2% use. Other analgesics taken were aspirin and ibuprofen, both with 4.9% use.

Thirty six percent of pregnant women used Tums<sup>®</sup> to help resolve heartburn symptoms. H<sub>2</sub>-blockers were also taken for acid reflux, most frequently ranitidine (8.2%). To help manage other gastrointestinal conditions, about 1 in 10 subjects had used docusate (9.8%). Other less frequent OTC choices included Mylanta<sup>®</sup>, PeptoBismol<sup>®</sup>, omeprazole, Maalox<sup>®</sup>, Metamucil<sup>®</sup>, senna, and Imodium<sup>®</sup>.

The most common OTC therapies to manage cough and cold symptoms were cough drops (13.1%), pseudoephedrine (9.8%), and Afrin<sup>®</sup> nasal spray (4.9%). Diphenhydramine (8.2%) was more commonly chosen over non-sedating antihistamines to treat allergies.

Besides a prenatal vitamin, the most commonly used vitamin or herbal was vitamin D, either alone (32.8%) or in combination with calcium (23%). Another frequently used supplement was DHA (21.3%) along with folic acid (9.8%). Vitamin B-6 (4.9%), iron (3.3%), zinc (1.6%), and vitamin A (1.6%) were other vitamins taken by the study population. Many subjects claimed to use a variety of herbals, such as ginger (8.2%), known to help reduce symptoms of nausea, along with melatonin, slippery elm, valerian, and Echinacea (each 1.6%).

Approximately 3% of women had not used any OTC medication, herbal, or vitamin during their current pregnancy. Stated differently, 96.7% of pregnant subjects had used at least one OTC medication, vitamin, or herbal supplement. Excluding prenatal vitamin use, 93.4% of pregnant women surveyed had taken an OTC product while pregnant. Furthermore, 78.7% of pregnant women had used an OTC medication during their pregnancy other than a vitamin or herbal.

Data on the perceived safety of OTC medication, vitamin, and herbal use during pregnancy is presented in Table 3. The majority of women surveyed regarded over-the-counter medications (62.3%), vitamins (67.2%), and herbals (54.1%)

all as “safe, but would talk to a healthcare professional before using.” No participant believed vitamins to be unsafe for use during pregnancy. In addition, no participant considered herbals as “very safe, don’t need to talk to a healthcare professional before using.”

Figures 1 and 2 present data pertaining to a pregnant woman’s sources of information and recommendation regarding OTC use during pregnancy. As Figure 1 indicates, the most utilized source of information was a physician (68.9%) followed by a midwife (55.7%). The next most referenced resource was the Internet with 44.3% use. Other non-professional references included books and magazines (32.8%) and friends and family (26.2%). One of the least drawn upon sources of information was a pharmacist (26.2%); the same percent as friends and family.

The final set of data presented in Figure 2 depicts sources of OTC medication recommendations during pregnancy. Most women received recommendations from a nurse or midwife (52.5%) followed by a physician (44.3%). Of those using OTC medications during pregnancy, 14.8% report choosing the product on their own. Even less received recommendations from a pharmacist (6.6%).

### Discussion

The need to avoid unnecessary medication exposure during pregnancy is common knowledge in the healthcare community and among most pregnant women. Interestingly, this has led to a decrease in prescription drug use, but an increase in the use of over-the-counter medications, herbals, and dietary supplements.<sup>7,8</sup> The convenience of self-treatment, perceived safety of OTCs, and high proportion of underinsured Americans could all contribute to this increasing prevalence of self-care. This study and many others have demonstrated that OTC use during pregnancy is extremely common. In the studied population, 96.7% had used an OTC medication, vitamin, or herbal while pregnant. The most common products used included prenatal vitamins, acetaminophen, cough drops, antacids, calcium, vitamin D, and DHA. Even after excluding prenatal vitamin use, 93.4% of women had used an OTC medication during their pregnancy.

Many patients consider OTC medications safe, including during pregnancy, because they are available without a prescription. Although uncommon, women may not realize the potential risk some over-the-counter medications may pose to themselves or their fetuses. Herbals and vitamins are thought by much of the public to be “natural” and thus harmless. One significant example is vitamin A, which was taken by one study participant. Vitamin A is known to be dangerous when supplemented during pregnancy, especially

the first trimester, due to possible spontaneous abortion, hydrocephalus, and cardiac anomalies.<sup>10</sup>

Although the majority of subjects claimed they would talk to a healthcare professional before using an OTC product, many had used potentially harmful medications during their current pregnancy. Vitamin A is one example stated above, but there are others, including ibuprofen and aspirin. Non-steroidal anti-inflammatory drugs, such as ibuprofen, should not be used in the first or third trimester due to their association with miscarriages, prolonged labor, gastroschisis, and increased blood loss.<sup>2</sup> Exposure to aspirin during late pregnancy may lead to increased bleeding and risk of premature closure of the fetal ductus arteriosus with subsequent pulmonary hypertension.<sup>2</sup> In addition, a small portion of women used PeptoBismol®, which they may not realize contains a salicylate component similar to aspirin.

Almost 10% of pregnant women surveyed used Sudafed® (pseudoephedrine), an oral decongestant with sympathomimetic properties. Its vasoconstrictive effects can lead to higher maternal blood pressure and reduced uterine blood flow, resulting in impaired fetal blood supply. Pseudoephedrine should be avoided in the first trimester as it has also been linked to cases of fetal gastroschisis.<sup>3</sup>

Daily intake of essential vitamins and minerals is important to consider during pregnancy. Women may not realize the many sources of certain vitamins they are receiving via OTC products, in addition to their dietary intake. Calcium is a good example, as several women claimed to be taking a multivitamin, calcium supplement, and Tums® (calcium carbonate) as needed. This amount of consumption could easily exceed the recommended daily amount of calcium of 1000 mg per day during pregnancy.<sup>11</sup> Although use of vitamin D has increased in popularity with recent reports of a multitude of health benefits, high doses in pregnancy can cause nausea and vomiting, poor appetite, weakness, and elevated serum calcium.<sup>2</sup>

Due to limited efficacy and safety data, many herbal and dietary supplements are not advisable during pregnancy. One example is zinc, which was used by one study participant. In normal doses, it appears safe and even beneficial if the patient is deficient. Taking zinc at high doses during the third trimester has been linked to premature births and stillbirths.<sup>12</sup> Echinacea, slippery elm, valerian, and melatonin are other supplements taken by subjects lacking evidence of effectiveness and safety during pregnancy. In fact, slippery elm has historically been used to induce abortion when inserted into the cervix. There is no reliable information

available concerning its abortifacient activity when taken orally.<sup>13</sup>

There are several limitations to this study. Due to a relatively small sample size, the results may not accurately represent the obstetric population, although it can still give a general perspective of the topics under study. Another limitation is the choice of survey locations, two urban women's clinics near the University of Minnesota Twin Cities campus. These patient responses may differ from those of a rural or suburban population. Also, because surveys were administered at women's clinics where subjects were receiving prenatal care, this could create a selection bias. Patients actively receiving prenatal care may be more informed about the safe use of OTCs and more likely to receive professional recommendations than those not receiving regular care during their pregnancy. The majority of subjects were at least college-educated and Caucasian; therefore a more diverse participant group would be beneficial in a future study.

There is a need for patient education regarding the safe and effective use of over-the-counter medications, herbals, and vitamins during pregnancy. Being accessible in a community pharmacy where OTCs are commonly purchased, pharmacists can be a valuable resource for this patient population. As drug experts, pharmacists have a wealth of knowledge pertaining to safe and effective drug use. Unfortunately, as seen in the survey responses, pharmacists are under-utilized as sources of information and recommendation.

The percentage of subjects receiving information from pharmacists regarding OTC use during pregnancy was the same as the percentage of those obtaining information from family and friends (26.2%). The Internet (44.3%) and books and magazines (32.8%) were more commonly employed sources of information than pharmacists (26.2%). Additionally, only 6.6% of subjects have received OTC recommendations from a pharmacist. This is far below other sources of recommendation, midwife or nurse (52.5%), physician (44.3%), and self (14.8%). Pharmacists need to be proactive in community and ambulatory settings by informing patients of their availability to answer drug-related questions, including during pregnancy. The public would benefit from education showcasing pharmacists as valuable resources for information on medication use during pregnancy and otherwise.

In conclusion, pharmacists have a responsibility to the public to assist in informed decision-making regarding OTC drug use during pregnancy. This optimal advice and care includes discussing risk versus benefit and explaining the lack of

confirmed safety data, especially with herbals and vitamins. Because of the modest evidence available describing the efficacy and safety of OTC products during pregnancy and associated neonatal outcomes, more studies need to be conducted on this topic. This will aid pharmacists and other healthcare professionals in providing the most accurate prenatal education pertaining to appropriate and safe over-the-counter medication use during pregnancy.

## References

1. Black RA, Hill DA. Over-the-Counter Medications in Pregnancy. *American Family Physician*. 2003; 67(12): 2517-2524.
2. Tillett J, Medved Kostich L, VandeVusse L. Use of Over-the-Counter Medications During Pregnancy. *J Perinat Neonat Nurs*. 2003; 21(4): 3-18.
3. Conover EA. Over-the-Counter Products: Nonprescription Medications, Nutraceuticals, and Herbal Agents. *Clinical Obstetrics and Gynecology*. 2002; 45(1): 88-98.
4. Glover DD, Amonkar M, Rybeck BR, Tracy TS. Prescription, Over-the-Counter, and Herbal Medicine Use in a Rural, Obstetric Population. *Am J Obstet Gynecol*. 2003; 188: 1039-1045.
5. Refuerzo JS, Blackwell SC, Sokol RJ, Lajeunesse L, Firchau K, Kruger M, Sorokin Y. Use of Over-the-Counter Medications and Herbal Remedies in Pregnancy. *American Journal of Perinatology*. 2005; 22(6): 321-324.
6. Werler MM, Mitchell AA, Hernandez-Diaz S, Honein MA. Use of Over-the-Counter Medications During Pregnancy. *Am J Obstet Gynecol*. 2005; 193: 771-777.
7. Buitendijk S, Bracken MB. Medication in Early Pregnancy: Prevalence of Use and Relationship to Maternal Characteristics. *Am J Obstet Gynecol*. 1991; 165(1): 33-40.
8. Rubin JD, Ferencz C, Loffredo C. Use of Prescription and Non-Prescription Drugs in Pregnancy. *J Clin Epidemiol*. 1993; 46(6): 581-589.
9. McKenna L, McIntyre M. What Over-the-Counter Preparations Are Pregnant Women Taking? A Literature Review. *Journal of Advanced Nursing*. 2006; 56(6): 636-645.
10. Kacew S. Effect of Over-the-Counter Drugs on the Unborn Child: What is known and how should this influence prescribing? *Pediatric Drugs*. 1999; 1(2): 75-80.
11. Dietary Supplement Fact Sheet: Calcium. *National Institutes of Health: Office of Dietary Supplements*. <http://ods.od.nih.gov/factsheets/Calcium>. Accessed 10/24/10.
12. Jellin JM, Gregory PJ, et al. Zinc monograph. *Pharmacist's Letter/Prescriber's Letter Natural Medicines Comprehensive Database*. [www.naturaldatabase.com](http://www.naturaldatabase.com). Accessed 8/23/10.
13. Natural Medicines Comprehensive Database. Slippery elm full monograph. [www.naturaldatabase.com](http://www.naturaldatabase.com). Accessed 8/25/10.

**Table 1.** Demographic characteristics of study participants. (n=61)

	<i>n (%)</i>
<b>Race</b>	
White	36 (59%)
Black	8 (13%)
Hispanic	4 (7%)
Asian	8 (13%)
Other	5 (8%)
<b>Age</b>	
18-20	4 (7%)
21-25	5 (8%)
26-30	30 (49%)
31-39	20 (33%)
40+	2 (3%)
<b>Trimester</b>	
First	8 (13%)
Second	27 (44%)
Third	25 (41%)
<b>Education</b>	
<High School	2 (3%)
High School Graduate	4 (7%)
Some College/Technical Degree	10 (16%)
4-Year College Degree	19 (31%)
Professional or Graduate Degree	25 (41%)
<b>Household Yearly Income</b>	
<\$10,000	4 (7%)
\$10,000-\$25,000	6 (10%)
\$25,000-\$50,000	13 (21%)
\$50,001-\$100,00	20 (33%)
\$100,001+	17 (28%)

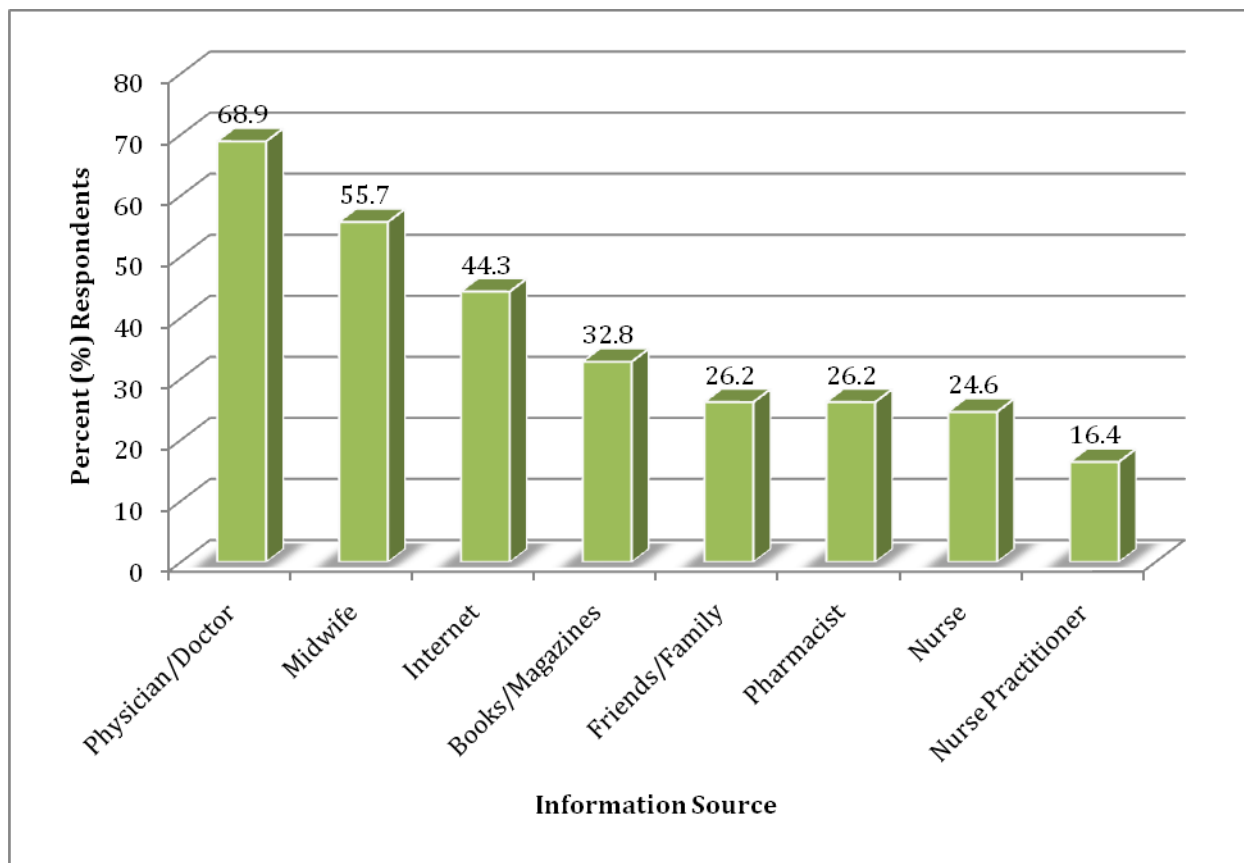


**Table 2.** Description and frequency of over-the-counter medication use in pregnant subjects.(n=61)

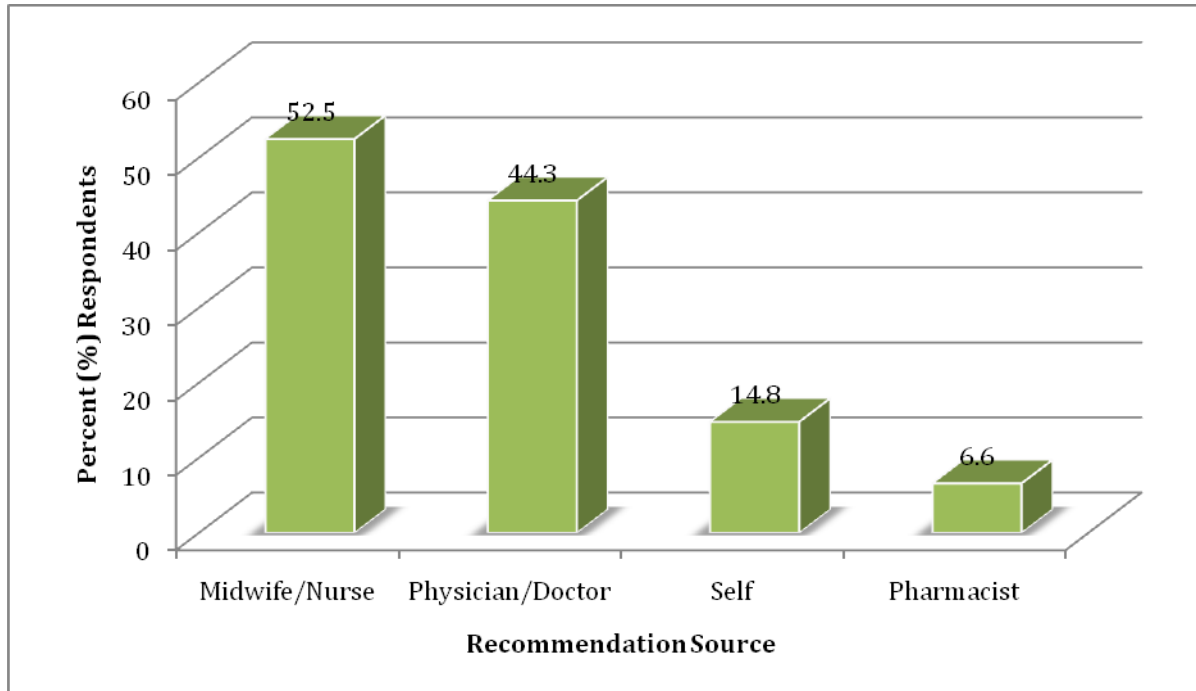
Have you taken any OTC medications for...	Yes (%)	Drugs	% of Total
Pain, Headache, or Fever	68.9	Acetaminophen	67.2
		Aspirin	4.9
		Ibuprofen	4.9
Cold, Cough, or Sore Throat	26.2	Cough drops	13.1
		Sudafed	9.8
		Afrin nasal spray	4.9
		Robitussin®	1.6
		Herbal nasal spray	1.6
		Tylenol Cold®	1.6
Heartburn or Acid Reflux	47.5	Tums®	36.1
		Ranitidine	8.2
		Famotidine	3.3
		Omeprazole	3.3
		Mylanta®	1.6
		Maalox®	1.6
		PeptoBismol®	1.6
		Coral Calcium	1.6
Constipation, Diarrhea, or Upset Stomach	18.0	Docusate	9.8
		PeptoBismol®	1.6
		Metamucil	1.6
		Imodium	1.6
		Milk of Magnesia	1.6
		Fiber	1.6
		Senna	1.6
Allergies	11.5	Diphenhydramine	8.2
		Loratadine	3.3
		Cromolyn	1.6
Vitamins	91.8	Prenatal	88.5
		Vitamin D	32.8
		Calcium + Vit D	23.0
		DHA	21.3
		Folic acid	9.8
		Multivitamin	6.6
		Vitamin B6	4.9
		Iron	3.3
		Calcium	1.6
		Zinc	1.6
		Vitamin A	1.6
Herbals or Supplements	14.8	Ginger	8.2
		Melatonin	1.6
		Slippery Elm	1.6
		Valerian	1.6
		Fish oil	1.6
		Echinacea	1.6
Other	6.6	Doxylamine	3.3
		Cortizone® cream	1.6
		Monistat®	1.6
		Dramamine®	1.6

**Table 3.** Data on perceived safety of over-the-counter medications, vitamins, and herbals.

How safe do you think ____ are during pregnancy?	Very safe, I don't need to talk to a healthcare professional before using. n (%)	Safe, but I would talk to a healthcare professional before using. n (%)	Safe, but I would check with resources, such as friends or the Internet, before using. n (%)	Unsafe, I would not use these during pregnancy. n (%)
Over-the-counter medications	2 (3.3%)	38 (62.3%)	13 (21.3%)	8 (13.1%)
Vitamins	11 (18%)	41 (67.2%)	9 (14.8%)	0 (0%)
Herbals	0 (0%)	33 (54.1%)	12 (19.7%)	14 (22.9%)



**Figure 1.** Percent respondents utilizing available information sources regarding over-the-counter medication use during pregnancy.



**Figure 2.** Percent respondents utilizing available sources of recommendation regarding over-the-counter medication use during pregnancy.

**Appendix A: Survey Cover Letter**

We are writing to ask for your help in a study. As researchers at the University of Minnesota College of Pharmacy, we are surveying a small number of pregnant women. If you are currently pregnant and 18 years or older, we invite you to take part in this survey.

Your help is very valuable and appreciated. This survey is being conducted in order to discover what over-the-counter (OTC) medications women use while pregnant and what influences their decisions. These results will help healthcare professionals understand the trends of OTC drug use during pregnancy and help guide information they provide to pregnant patients.

If you have any concerns or questions about the safety of the medications you are using, please contact your doctor or pharmacist.

This survey will take approximately 5-10 minutes to complete. Please answer the questions regarding your current pregnancy. Do not put your name on the survey. When finished, please return the survey by placing it in the designated box. By returning the survey, you provide your consent to participate in the project. There are no expected risks to you by participating in the study. Investigators will not be able to identify you and your responses will be kept confidential.

Your completion of this survey is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or the clinics where the survey is administered. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting these relationships.

If you have comments or questions about this study please contact Sarah Westberg by phone at (612) 625-4632 or email [swestber@umn.edu](mailto:swestber@umn.edu). If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Thank you in advance for your time and honest response. Your part in this study is valued and very much appreciated. You may keep this cover letter for your future reference.

Sincerely,

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## Appendix B: OTC Medication Use During Pregnancy Survey

1. Have you taken any over-the-counter (OTC) medications for pain, headache, or fever during your current pregnancy?

*Examples:* Tylenol (acetaminophen) Excedrin  
Motrin, Advil (ibuprofen) Aspirin

Yes  No

If yes, please list the medications you have used: \_\_\_\_\_

2. Have you taken any OTC medications for a cold, cough, or sore throat during your current pregnancy?

*Examples:* Cough drops/Lozenges Afrin Nasal Spray (oxymetazoline)  
Robitussin (guaifenesin) Sudafed (pseudoephedrine)

Yes  No

If yes, please list the medications you have used: \_\_\_\_\_

3. Have you taken any OTC medications for heartburn or acid reflux during your current pregnancy?

*Examples:* Tums/Rolaids (antacids) Zantac (ranitidine)  
Prilosec (omeprazole) Pepcid AC (famotidine)

Yes  No

If yes, please list the medications you have used: \_\_\_\_\_

4. Have you taken any OTC medications for constipation, diarrhea, or upset stomach during your current pregnancy?

*Examples:* Pepto Bismol Immodium AD (loperamide)  
Colace (docusate) Metamucil

Yes  No

If yes, please list the medications you have used: \_\_\_\_\_

5. Have you taken any OTC medications for allergies during your current pregnancy?

*Examples:* Benadryl (diphenhydramine) Zyrtec (cetirizine)  
Claritin (loratadine) Cromolyn Nasal Spray

Yes  No

If yes, please list the medications you have used: \_\_\_\_\_

6. Have you taken any over-the-counter vitamins during your current pregnancy?

*Examples:* Woman's Daily Multivitamin Folic acid  
Prenatal Vitamin Calcium + Vitamin D

Yes  No

If yes, please list the vitamins you have used: \_\_\_\_\_

7. Have you taken any over-the-counter herbals or supplements during your current pregnancy?

*Examples:* St. John's Wort Ginger  
Echinacea Valerian Root

Yes  No

If yes, please list the herbals or supplements you have used: \_\_\_\_\_

8. Have you taken any other OTC medications during your current pregnancy?

Yes  No

If yes, please list the medications you have used: \_\_\_\_\_

9. How safe do you think over-the-counter medications are during pregnancy (excluding vitamins and herbals)?

- Very safe**, I don't need to talk to a healthcare professional before using.  
 **Safe**, but I would talk to a healthcare professional before using.  
 **Safe**, but I would check with resources, such as friends or the Internet, before using.  
 **Unsafe**, I would not use these during pregnancy.

10. How safe do you think vitamins are during pregnancy?
- Very safe**, I don't need to talk to a healthcare professional before using.
- Safe**, but I would talk to a healthcare professional before using.
- Safe**, but I would check with resources, such as friends or the Internet, before using.
- Unsafe**, I would not use these during pregnancy.
11. How safe do you think herbals are during pregnancy?
- Very safe**, I don't need to talk to a healthcare professional before using.
- Safe**, but I would talk to a healthcare professional before using.
- Safe**, but I would check with resources, such as friends or the Internet, before using.
- Unsafe**, I would not use these during pregnancy.
12. Where did you or have you gotten your information about the use of over-the-counter medications during your pregnancy?  
**(circle all that apply)**

Physician/Doctor	Midwife
Pharmacist	Books/Magazines
Nurse	Friends/Family
Nurse Practitioner	Internet
Other (please specify) _____	

13. If you have used OTC medicines while pregnant, who recommended them? **(circle all that apply)**
- |                  |                    |
|------------------|--------------------|
| Physician/Doctor | Midwife/Nurse      |
| Pharmacist       | I chose on my own. |

Please write in or circle the response that best describes you.

**Age:** \_\_\_\_\_ years old

**Race:** White/Caucasian      Black/African American      Hispanic  
Asian/Pacific Islander      American Indian/Alaskan Native  
Other (please specify) \_\_\_\_\_

**Current Pregnancy Trimester:** 1<sup>st</sup> (0-3 months)      2<sup>nd</sup> (4-6 months)      3<sup>rd</sup> (7-9 months)

**Annual Household Income:** <\$10,000  
\$10,000-\$25,000  
\$25,001-\$50,000  
\$50,001-\$100,000  
>\$100,000

**Highest Level of Education:** Less than high school  
High school diploma  
Some college or technical degree  
4-year college degree  
Professional or graduate degree



*Thank you for completing this survey. Your time and honest response is greatly appreciated!  
If you have any questions or concerns about the safety of the medications you are using, please contact your doctor or pharmacist.*