Completeness, Accuracy and Presentation of Information on Interactions Between Prescription Drugs and Alternative Medicines: An Internet Review

Lou Ann Scarton, Guilherme Del Fiol, Qing Treitler-Zeng

Department of Biomedical Informatics
University of Utah, USA
71% using CAM for children’s asthma

54% did not share with provider
25% of 150 sites with statements that could lead to harm

97% omitted information

Thirty-eight sites (25%) contained statements that could lead to direct physical harm if acted upon. One hundred forty five sites (97%) had omitted information. We found no relationship between technical quality criteria and potentially harmful information.
Drug-CAM Interactions

• Common and potentially severe
• Little is known about quality of online CAM-drug interaction information
• Study goal:
  – Assess the quality of online drug-CAM interaction
Materials and Methods

Search for interaction checkers
(3 search engines)

Reference standard
• 4 drugs: Warfarin, Lipitor, Simvastatin, Plavix
• 3 CAMs: St. John’s Wort, Ginkgo, grapefruit
• 10 moderate / major interactions from Natural Medicines Comprehensive Database

Quality assessment
• Completeness, accuracy,
• Readability (Flesch-Kincaid), recommendation
• Scientific Evidence
# Results

<table>
<thead>
<tr>
<th>Site</th>
<th>Completeness</th>
<th>Severity accuracy</th>
<th>Recommendation</th>
<th>Reading level*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVS</td>
<td>80%</td>
<td>75%</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Dr. Oz</td>
<td>80%</td>
<td>Missing</td>
<td>N</td>
<td>11</td>
</tr>
<tr>
<td>Medline Plus</td>
<td>50%</td>
<td>60%</td>
<td>Y</td>
<td>24</td>
</tr>
<tr>
<td>Drugs.com</td>
<td>60%</td>
<td>17%</td>
<td>Y</td>
<td>18</td>
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<tr>
<td>Vitamin Herb</td>
<td>50%</td>
<td>Missing</td>
<td>Y</td>
<td>17</td>
</tr>
<tr>
<td>University</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthline</td>
<td>70%</td>
<td>71%</td>
<td>Y</td>
<td>14</td>
</tr>
<tr>
<td>Medscape</td>
<td>100%</td>
<td>50%</td>
<td>N</td>
<td>19</td>
</tr>
</tbody>
</table>

*Flesch-Kincaid: Ideal is 9th grade level
Results

• None of the sites included references to scientific evidence

• Navigation and presentation vary widely
  – No consistency
  – Usability issues
Example - Dr. Oz

**Antibiotics:** Antibiotic agents that are transported by P-glycoprotein or metabolized by cytochrome P450 may be altered by concomitant use of St. John's wort, an inducer of P-glycoprotein and cytochrome P450 3A4 (186;188;189).

- Soy isoflavones
- Sparteine
- Spearmint
- Spinach
- Spinach oleracea
- Spirogermanium
- Spirulina
- Spleen extract
- Squill
- St. Ignatius bean
- **St. John's wort**
- Stachys
- Star anise
- Stellaria
- St. John's wort metabolites
- Stinging nettle
- Stinking goosefoot
- Strawberry
- Strontium

**St. John's wort/Drug Interactions:**
- General
- 5HT1 agonists (triptans)
- Alcohol
- Anesthetics
- Antianxiety drugs
- Antibiotics
- Anticoagulants and antiplatelets
- Antidepressant agents
Are there interactions with medications?

**Major**

Do not take this combination.

Alprazolam (Xanax)
Alprazolam (Xanax) is commonly used for anxiety. The body breaks down alprazolam (Xanax) to get rid of the body gets rid of alprazolam (Xanax). Taking St. John's wort along with alprazolam (Xanax) might decrease the effectiveness of alprazolam (Xanax).

Aminolevulinic acid
Aminolevulinic acid can make your skin sensitive to the sunlight. St. John's wort might also increase your sensitivity to the sunlight. St. John's wort along with aminolevulinic acid might increase the chances of sunburn, blistering or rashes on areas where you wear sunscreen and protective clothing when spending time in the sun.

Amitriptyline (Elavil)
The body breaks down amitriptyline (Elavil) to get rid of it. St. John's wort can increase how quickly the body breaks down amitriptyline (Elavil) by increasing how quickly the body breaks down amitriptyline (Elavil).

Birth control pills (Contraceptive drugs)
Some birth control pills contain estrogen. The body breaks down the estrogen in birth control pills to get rid of breakdown of estrogen. Taking St. John's wort along with birth control pills might decrease the effectiveness of birth control pills along with St. John's wort, use an additional form of birth control such as a condom.
Discussion

• Quality of information found was inadequate

• None of the sites performed well according to criteria
  – Incomplete information: consumer concludes there is no interaction
  – Lack of severity: consumer may under or overestimate effect of interaction
  – Lack of recommendation
  – Readability scores: closer to graduate level
Limitations

• Only 7 Web sites evaluated
• Only 10 drug-CAM interactions
  – Limited to moderate and severe
• Flesch-Kincaid
  – Not as accurate for very short phrases
  – Does not measure health literacy level
Future Studies

• Larger sample of drugs and CAM
• Formal usability assessment
  – Determine optimal navigation and presentation format
• Interventions to promote patient-provider communication
Conclusion

• Overall low quality of online drug-CAM interaction information
  – Risk related to missing information

• Important challenges
  – Patients’ not sharing CAM use with providers
  – Internet may be the only source consumers use for CAM-drug interactions
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• Contact
  – Lou Ann Scarton
    • Univ. of Utah, School of Medicine
    • Louann.scarton@utah.edu

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