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Evaluation of medication use in elderly patients in Kuwait

Introduction

It has been noted that there is a slight decrease in absorption of some medications in geriatrics as a result of increased gastric pH and delayed gastric emptying. Furthermore, elderly people (usually defined as being above the age of 65 y) [1,2] tend to have reduced splanchnic blood flow, which consequently results in decreased drug absorption.

Other changes include reduced absorption surface and gastrointestinal motility [3]. The volume of distribution and half-life for lipophilic drugs are increased as a result of the increase in body fat mass and the decrease in body lean mass. Additionally, the plasma concentration of hydrophilic drugs is elevated due to the reduction in the total body water. Moreover, there is an escalation in the free fraction of highly protein-bound acidic drugs, due to a decrement in serum albumin. The free fraction of basic drugs is lessened since there is a surge in α 1- acid glycoprotein levels [3]. Similarly, renal elimination of water soluble drugs is affected as a result of reduced renal blood flow and glomerular filtration rate [3].

The elderly usually tend to have increased sensitivity to drug effects as a result of deterioration in homeostatic mechanisms. Adrenergic, cholinergic, dopaminergic, GABA and opioid receptors are the most affected receptors with age-related pharmacodynamic changes [4]. Examples of drug therapy problems in elderly include overuse of medications, inappropriate prescribing, under-treatment/ under-prescribing, prescribing cascades, adverse drug effects and medication non-adherence [4, 5]. This leads to additional physician visits, additional medications, increased hospitalisations, and increased morbidity and mortality.

Providing a safe and effective drug therapy is one of the greatest challenges in geriatrics. Several studies worldwide, particularly in developed countries, have reported the prevalence of drug therapy problems and interventions to optimize pharmacotherapy in a variety of clinical settings.

Being a female, consuming alcohol, the particular polypharmacy used, the number of diseases, and consuming OTC drugs with/without prescription drugs, were all concluded to be risk factors for inappropriate drug intake in a study done in Lebanon [6].

In the USA, about 10% of the elderly population were using a potentially inappropriate anticholinergic medication; the most frequently used were cyclobenzaprine, promethazine, amitriptyline, hydroxyzine, and dicyclomine [7]. In another study conducted in the USA the most common potentially inappropriate medication (PIM) was found to be aspirin at a dose greater than 150 mg. The top three omitted medications in the literature were statins, angiotensin converting enzyme inhibitors in patients with heart failure, and vitamin D in patients with osteoporosis [8]. Several factors affected patient's adherence such as absence of a pharmacy in the neighborhood, unavailability of some medications at the closest medical store, poor communication between the physician and patient due to difference in language and failure in explaining to the patient the consequences of not being adherent to the medication regimen [9].

To our knowledge, there are no published studies assessing medication use among the elderly patients in Kuwait.

The aim of this pilot study was to get a better understanding of the current medication use in the elderly and some of the factors that influence non-adherence in this population. Such a

In this issue

study is needed to identify the common drug therapy problems and to determine the appropiate interventions to optimize patient care for the elderly in Kuwait.

Methods

A descriptive, cross-sectional study was conducted by interviewing and accessing the medical files of 233 Kuwaiti elderly patients attending nine polyclinics that provide geriatric care. The study was carried out during the period from January to April, 2016. Ethical clearance was obtained from the "Human Ethical Joint Committee for Student Research-Ministry of Health and Health science center, Kuwait University". Patients with cognitive impairment and/or psychiatric illness were excluded from the determination of medication adherence Data were collected via face-to-face structured interviews of the respondents in the geriatric clinics using a pre-tested questionnaire. The pre-tested questionnaire comprised of three parts.

Part A: to collect information about patients' demographics and other characteristics (age, gender, educational level, residence area, general health and smoking habit) and knowledge about their own awareness of their diseases and medications.

Part B: to collect information regarding the patients' chronic diseases and medications, as well as any current symptoms/problems/conditions during the use of their medications and whether they consulted their physicians for these problems and what recommendations were provided to them.

Part C: to assess patients' medication adherence using the 8-Item Morisky Medication Adherence Scale (MMAS-8) score and the reasons for non-adherence.

Patients who agreed to participate in the study were assured of confidentiality and gave written consent. All the necessary data about clinical variables including diseases and medications were obtained from the attending physicians from the patients' medical records. Data analysis were performed using SPSS version 23. $P < 0.05$ was considered statistically significant.

Tools used in evaluating medication use and medication adherence

Beers' criteria

Beers' criteria is a list of medications that was developed and updated regularly by the American Geriatric Society [10, 11]. This criteria was developed to identify PIMs that are used in the geriatrics. Therefore, it aids in preventing adverse events and other drug related problems among this population.

STOPP (Screening Tool of Older Person's Prescriptions)/START (Screening Tool to Alert Doctor's to the Right Treatment) criteria

STOPP criteria consists of 65 indicators of PIMs, which include drug-drug interactions, drug-disease/condition interaction, therapeutic duplications and drugs that increase the risk of cognitive impairment and falls in the elderly. START criteria compromises 22 medications that are possibly omitted while prescribing for elderly patients. The STOPP/START criteria was validated and implemented as European Prescribing Tool for elderly patients [12].

Medication Appropriateness Index (MAI)

The MAI is used to assess the rationality of each medication being taken. This index consists of 10 criteria which are indication for the medication used, medication effectiveness for indication, correct dosage, correct directions, practical directions, significant drug-drug interactions, significant drug-disease interactions, unnecessary duplicate therapy, duration of therapy and cost of medication (Table 1) [13-16]. The MAI is the most comprehensive and commonly used tool in assessing medication appropriateness; however, it does not assess adverse drug events (ADEs).

Morisky Medication Adherence Scale (MMAS)

The modified MMAS-8 consists of 7 closed-ended questions and one 5-pointed response question. On this scale, a score of 8 indicates high adherence, 6-7 medium adherence and < 6 low adherence [17].

Limitations of the study

The calculated sample size was not reached, and other polyclinics established later after the start of the study were not included in the sampling frame. These limitations would have affected the generalisability of the findings to the wider population. Part

Table 1. Medication appropriateness index (MAI Score)

Inappropriate Criteria	Score
No Indication	3
Less or not Effective	3
Incorrect Dosage	2
Incorrect Directions	2
Drug-drug interactions	2
Drug-disease interaction	2
Impractical Directions	1
Unnecessary duplication	1
Inappropriate Duration	1
Cheaper alternative is available	1

of the collected data in this study depends upon information given by respondents and open to bias by inaccurate patient recall or by providing what is perceived to be the right response. A further limitation is the cross-sectional nature of the data that represented one point in time and therefore does not reflect any changes over time.

Results and Discussion

The most common chronic diseases among the study population were hypertension, diabetes and dyslipidemia. The most commonly used PIMs were orphenadrine and glibenclamide which is similar to previous reports [7, 12, 18].

Table 2. Prevalence of potentially inappropriate medications (PIMs) among the study population according to Beer's criteria (n=43)

PIMs	Freq	(%)
Orphenadrine	12	27.9
Glibenclamide	9	20.9
Clidinium-chlordiazepoxide	5	11.6
Meloxicam	5	11.6
Amitriptyline	4	9.30
Methyldopa	3	6.98
*Others	12	27.9

* includes diltiazem, aspirin, diclofenac potassium, hyoscyamine, quetiapine, amiloride, lorazepam, ibuprofen, pregabalin, escitalopram, and levetiracetam.

Table 2 shows a list of medications that were found to be potentially inappropriate according to Beers' criteria. There was a significant association between the number of medications used and the identification of at least one PIM according to Beers' criteria. Patients taking ≥ 5 medications were found to be using more PIMs compared to those taking ≤ 4 medications which is lower compared to previous studies from European countries and Taiwan, which ranged from 36-51% [12, 19].

One hundred and fifty six patients (67%; 95% CI: 61-73) were prescribed one or more medications inappropriately i.e., met one or more of the Medication Appropriateness Index criteria. Based on START criteria, 39% had at least one Potentially Prescribing Omission (PPO).

The most frequently omitted drugs in this study were aspirin as a primary prophylaxis in patients with diabetes and co-existing cardiovascular risk factors and also as a secondary prophylaxis, statins in patients with diabetes and metformin in patients with type 2 diabetes as a first line therapy. These PPOs are similar to those indicated by the studies performed in Taiwan and the six European countries [12, 19].

Our findings show that about two-fifths of the study population are at risk of increased morbidity and mortality as a result of omission of drug therapy that is indicated for treatment or prevention of a disease or condition. A possible explanation for such high prevalence of PPOs may be that some clinicians do not adhere to the clinical guidelines and prefer to treat their patients based on their own clinical experience. Other possible reasons may be the physicians' fear of adverse effects and concerns of non-adherence when prescribing more medications. The latter could be a reasonable cause for PPOs as the present study demonstrates that the polypharmacy attended is a significant predictor for PPOs ($p < 0.05$).

Table 3 demonstrates the frequency of PPOs among the study population. A significant association was found between the number of medications taken by the patients and the risk of at least one medication being omitted from their therapy regimen ($p < 0.05$). Patients taking ≥ 5 medications were at more risk of having at least one PPO (43%) to those taking ≤ 4 medications (29%) ($p = 0.04$).

Table 3. Prevalence of potentially prescribing omissions among the study population according to START Criteria (n=91)

Medication	Frequency	%
Aspirin	55	60.4
Statin	33	36.3
Metformin	19	20.9
Proton Pump Inhibitor	2	2.20
Antihypertensive	2	2.20
Salbutamol	2	2.20
*Others	2	2.20

* includes warfarin and clopidogrel

Out of the 322 inappropriately prescribed medications, vitamin B complex (n= 68, 21%), beta-blockers (n= 24, 7.5%), and statins (n=23, 7%) were the most common PIMs according to MAI. Table 4 shows the inappropriately prescribed medications among the study population.

There were significant associations between the patient's MAI score and the number of medications used by the patient or the number of diseases. Inappropriate prescribing was found to be significantly prevalent among those taking ≥ 5 medications (78%) compared to those taking ≤ 4 medications (39 %) ($p < 0.001$); and also among those has ≥ 3 disease (71%) compared to those had 1-2 diseases (56%) ($p= 0.03$). Eight patients were excluded from the determination of medication adherence due to cognitive impairment and/or psychiatric illness .

About 61% of respondents had optimal adherence and 39% had poor adherence. Respondents with higher education, those taking ≥ 5 medications and those that had ≥ 3 diseases were found to be significantly more non-adherent than those with low-intermediate level education, those taking 1-4 medications or with 1-2 diseases ($p<0.05$).

Patients with higher education were more non-adherent compared to those with low-intermediate level education. This is in contrast with the results of previous studies which reported that those with more years of education tend to have better health and healthier behaviors including medication adherence [20 21].

The reasons for this contrary finding are unclear; however, it might be that participants with high education were more afraid of the side effects that may occur from the drugs. Non-adherence was significantly greatest among those taking ≥ 5 medications, which is consistent with previous studies [22].

Table 4. Inappropriately prescribed medications among the study population according to MAI in 322 patients

Medication Name /Therapeutic Class	Frequency	%
Vitamin B complex	68	21.1
Beta Blockers	24	7.45
Statins	23	7.14
Low dose Aspirin	21	6.52
Aluminium hydroxide /magnesium hydroxide /simethicone	22	6.83
Insulin	18	5.59
Oral Anti-diabetics	18	5.59
Furosemide	11	3.42
Gabapentin	9	2.80
Ranitidine	9	2.80
Inhaled Corticosteroids	7	2.17
Proton Pump Inhibitors	7	2.17
Verapamil	6	1.86
Beta 2 agonist	5	1.55
Fenofibrate	5	1.55
Calcium	5	1.55
Etoricoxib	4	1.24
Carbamazepine	4	1.24
Diltiazem	3	0.93
Allopurinol	3	0.93
Thiazide diuretics	3	0.93
Vitamin D	3	0.93
Others	44	13.7

It is evident that reducing the total number of tablets per day can improve medication adherence. Thus, there is a need to reduce medications complexity through avoiding polypharmacy and using regimens with fewer daily doses among the non-adherent population [23].

The finding that about two-fifths of the study population were non-adherent to their medications is of particular concern as a potential contributing factor to

poor clinical outcomes including re-hospitalisation, increased mortality and increased healthcare costs [24, 25], and highlights the need for its improvement in order for elderly patients to derive optimal benefit of their prescribed medications.

The most common reported symptoms/ conditions were heartburn and indigestion, constipation and dizziness. In this study, the use of verapamil in patients with chronic constipation was a common PIM prescribed to the elderly, which was similar to a study conducted in Taiwan [19]. There were significant correlations between the clinical symptoms/conditions developed and the use of PIMs among the study population. The prevalence of inappropriate prescribing and the significant association between the use of PIMs and the symptoms/conditions/problems developed during therapy indicated by the present study are of concern.

Inappropriate prescribing increases the risk of adverse drug events, hospitalisation and healthcare spending [5, 26]. Hence, the present findings highlight the need for design and implementation of effective interventions. Several studies showed that education to patients, pharmacists and physicians, computerised support systems, medication review by pharmacists, geriatric medicine services, multidisciplinary teamwork and regulatory policies are all successful methods of interventions [5, 26-29].

The top four barriers for non-adherence reported by the study population were that there is no one at home to remind them to take their medicines, lack of pharmacists' communication, polypharmacy and worries about long-term adverse effects of medicines.

Polypharmacy is a common issue that deteriorates the quality of life of elderly patients and results in complication of therapy [30]. Several studies have reported a variety of consequences resulting from polypharmacy, for instance non-adherence, adverse drug reactions, drug-drug interactions, increased risk of hospitalisation, medication errors and increased healthcare costs [5, 24, 30]. Interventions such as the establishment of multidisciplinary teamwork including pharmacists, patient and prescriber education, and computerised prescribing alerts need to be implemented and evaluated to overcome the prevalence of polypharmacy among elderly patients [22, 24, 32].

Pharmacists need to develop counselling strategies to educate elderly patients about their medications, and provide regular follow-up to ensure that patients are taking medications as directed. Implementation of a collaborative process in which the pharmacist works directly with other healthcare professionals and the patient to identify, resolve and prevent drug - related problems could help to overcome the medication non-adherence identified by this study. There is evidence to support the benefits of pharmaceutical care on patient clinical outcomes and healthcare costs [33].

In conclusion, this study identified important factors to help healthcare professionals in Kuwait to plan for and design appropriate multifaceted interventions to improve prescribing practices and quality and medication adherence in the elderly.

References

1. World Health Organization (2016). Definition of an older or elderly person. Available from: http://www.who.int/ healthinfo/survey/ageingdefnolder/en/.
2. Zizza CA, Ellison KJ and Wernette CM (2009). J Gerontol A Biol Sci Med Sci 64 (4), 481-6.
3. Corsonello A, Pedone C and Incalzi RA (2010). Curr Med Chem, 2010. 17(6), 571-84.
4. Lee JK, Mendoza DM, Mohler JM and Lee EM (2013). Geriatrics. In: Pharmacotherapy: Practice and Principles. (eds: Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malaone PM, Kolesar JM and Dipiro JT). McGraw Hill, New York, 7-24.
5. UpToDate [Internet]. Rochon (PA): Drug prescribing for older adults. c2016 http://www.uptodate.com/contents/ drug-prescribing-for-older-adults?source=search_ result&search=drug+prescribing+for+older+adults&selectedTitle=1~150#H32
6. Saab YB, Hachem A, Sinno S and El-Moalem (2006). Drugs Aging 23 (9), 743-52.
7. Kachru N, Carnhan RM, Johnson ML and Aparasu RR (2015). Drugs Aging 32 (5), 379-89.
8. Pyszka LL, Ranola TMS and Milhans SM (2010). Consult Pharm 25 (6), 365-73.
9. Hegde SKB, Fathima FN, Agrawal T and Misquith D (2015). Geriatr Gerontol Int.
10. American Geriatrics Society Beers Criteria Update Expert Panel (2012). J Am Geriatr Soc 60 (4), 616-31.
11. American Geriatrics Society Beers Criteria Update Expert Panel (2015). J Am Geriatr Soc 63 (11), 2227-46.
12. Gallagher P et al. (2011). Eur J Clin Pharmacol 67 (11), 1175-88.
13. West LM, Cordina M and Cunningham S (2012). Pharm Pract 10 (4) 181-7.
14. Bregnhoj L et al (2007). Pharm World Sci 29 (3), 109-15.
15. Fitzgerald LS, et al. (1997). Ann Pharmacother 31 (5), 543-8.

16.Hanlon JT and Schmader KE (2013). Drugs Aging 30 (11), 893-900.
17.Xi T, Patel I and Chang (2014). Innovations in Pharmacy 5 (3).
18.Alhmoud E, Khalifa S and Bahi AA (2015). Int J Clin Pharm 37 (5), 815-21.
19.Liu CL et al. (2012). Arch Gerontol Geriatr 55 (1), 148-51.
20.Bader RJ et al (2015). East Mediterr Health J 21 (5) 309-18.
21.Oates DJ and Paasche-Orlow MK (2009). Circulation 119 (7), 1049-51.
22.Claxton AJ, Cramer J and Pierce C (2001). Clin Ther 23 (8), 1296-310.
23.Kronish IM and Ye S (2013). Prog Cardiovasc Dis 55 (6), 590-600.
24.Simpson SH, et al (2014). BMJ 333 (7557), 15-20.
25.Sokol MC, McGuigan KA, Verbrugge RR and Epstein RS (2005). Med Care 43 (6), 521-30.
26.O'Connor MN, Gallagher P and O'Mahony D (2012). Inappropriate prescribing: criteria, detection and prevention. Drugs Aging 29 (6), 437-52.
27. Abd Wahab MS (2015). Int J Clin Pharm 37 (6), 971-4.
28.Bregnhoj L et al (2009). Eur J Clin Pharmacol 65 (2), 199-207.
29.Kaur S, Mitchell G, Vitetta L and Roberts M (2009). Drugs Aging 26 (12), 1013-28.
30.Rollason V and Vogt N (2003). Drugs Aging 20 (11), 817-32.
31.Maher RL, Hanlon J and Hajjar ER (2014). Expert Opin Drug Safety 13 (1), 57-65.
32.Cooper JA, et al. (2015). BMJ Open 5 (12), e009235.
33.Berenguer B, La Casa C, de la Matta MJ and Martin-Calero MJ (2004). Curr Pharm Des 10 (31), 3931-46.

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TEST YOUR KNOWLEDGE

Answers on back page

1) ***Which of the following is a reason for decrease in absorption of some medications in the elderly?***

a) Increased gastric pH
b) Delayed gastric emptying
c) Reduced absorption surface
d) All of the above

2) ***In the elderly, there is an increase of the free fraction of highly protein-bound acidic drugs due to***

a) Increase in serum albumin
b) Decreased respiratory rate
c) Reduction in serum albumin
d) Decreased gastrointestinal motility

3) ***The half-life of lipophilic drugs is increased as a result of***

a) Decrease in body lean mass
b) Decrease in body fat mass
c) Increase in body lean mass
d) Increase of urinary pH

Is there a problem?
A 30 year old male patient was given the following prescription for his newly diagnosed primary generalized tonic-clonic epilepsy. Is there any *major* error with the prescription?

YAX HOSPITAL

Patient Name: Ahmad Age: 30 years
Address: Street No.16

Rx
Carbamazepine tablets
400mg twice daily
Send one pack

Dr. Enezy
Signature Date: 9/03/17

Answer (Prescription Exercise)

Initial dose is high. Initial dose should be 100-200mg, 1-2 times daily, and then increased slowly to usual dose of 800—1200 mg daily in divided doses.

Source: British National Formulary

TOPICAL ISSUES AND CONTROVERSIES

Drugging our environment

In 2012, researchers in Klaus Kummerer's lab at the University of Lüneburg tested water samples from various sources in Germany for the widely prescribed anti-diabetic drug metformin, which treats high blood sugar by suppressing glucose production in the liver. Humans do not metabolise the drug, so within 24 h of it being taken, metformin is excreted from the body essentially unchanged.

Because of its high prescription rate (the U.S. alone dispensed 76.9 million metformin prescriptions in 2014), it's not surprising that the drug is abundant in the environment. Metformin was present in every water sample Kümmerer's team tested, including tap water, at concentrations exceeding environmental safety levels proposed by an international Rhine River Basin agency by 50 percent.

When publishing the results in 2014, Kümmerer and his co-authors concluded that the drug is likely to be distributed over a large part of the world's potable water resources.

The problem is not limited to metformin. Evidence was found of 32 pharmaceuticals and personal care products in the water and 30 in the lake Michigan's sediment in the US. Fourteen of these were measured at concentrations considered to be of medium or high risk to the ecosystem, based on data from the US Environmental Protection Agency (EPA) and other researchers. Metformin topped the list, at concentrations of concern even 3 kilometers off the shores of Milwaukee.

Ecologists have long recognized that pharmaceuticals, both un-metabolised drugs like metformin and others that break down into various metabolites, are polluting the environment, but researchers have traditionally focused on just two classes: antibiotics and endocrine-disrupting compounds such as the birth control hormone estradiol. Antibiotics in the environment promote antibiotic resistance in a range of bacterial species, and endocrine disruptors are known to affect development and reproduction in animals.

All pharmaceuticals, by design, are meant to elicit a biological response and therefore it is necessary to know what the environmental consequences are.

In the late 1990s, millions of vultures around India and Paki-stan died of kidney failure after eating livestock carcasses that contained the anti-inflammatory drug diclofenac, given to cattle to treat lame-ness and fever. India, Nepal, and Pakistan banned veterinary use of diclofenac, but in 2013, Spain, home to 95% of Europe's vultures, authorised the sale of the drug for use in animals. Wildlife groups immediately called for a full veterinary ban on the drug, and the European Commission asked the European Medicines Agency (EMA) to conduct a review of the risk of the drug. In December 2014, the EMA concluded that vultures and other carrion-eating birds were at risk from diclofenac, but the European Commission has not yet made a final decision on whether it will outlaw the drug. Meanwhile, many more terrestrial species are at risk from countless other pharmaceuticals polluting the environment. Some 10 to 30 percent of the antidepressant fluoxetine is excreted unchanged by humans, and, like many other pharmaceuticals, fluoxetine is environmentally stable.

Pharmaceuticals are ubiquitous in wastewater, deposited primarily from human urine and feces. The active ingredients from leftover pills thrown in patients' trash or even hospital waste also find their way to waterways, but the contribution of those sources pales in comparison to the share from humans.

Sewage treatment plants remove some pharmaceuticals from water during basic filtering processes, but many pass through unhindered. Metformin, for example, is stable against common water treatments

such as UV light irradiation. And at this point, it is prohibitively expensive to add technologies that can filter out these chemicals. From sewage plants and landfills, drugs make their way into streams, rivers, lakes, seawater, and even into drinking water. Currently, however, the EPA does not regulate even a single human pharmaceutical in drinking water. An EPA list of pollutants that *may* make water unsafe, but are not regulated, includes eight hormones and one antibiotic. Metformin is not on the list.

Many ecologists believe that should change. Pharmaceutical use in the general population is growing, with sales expected to increase five percent annually for the next five years, so more and more drugs are likely to be entering the environment. Pharmaceuticals are designed to maintain their strength and quality on the long route from manufacturer to pharmacy to medicine cabinet, and even sometimes inside the human body. That same stability, unfortunately, prevents many pharmaceuticals from degrading in the environment. To make matters worse, pharmaceuticals are hard to detect and measure in the environment. Detection methods are improving, however.

Everyone has to start thinking about preventative measures and not wait until the negative effects play out. Papers on the ecological impact of drugs have examined only a handful of the estimated 4,000 pharmaceuticals used around the globe in medicine and agriculture. Some scientists argue that we should spend less time identifying individual drugs in the environment and more time trying to prevent them from reaching it in the first place. One option is to outfit wastewater treatment plants with equipment to remove pharmaceuticals. In Sweden, for example, Brodin and colleagues are re

-building an entire wastewater plant to incorporate ozonation, a process that can remove some pharmaceuticals from water by bubbling ozone gas through it. The team of researchers will then monitor local streams to see how the plant upgrades affect organisms in the surrounding ecosystem.

Technologies such as ozonation and nanofiltration are expensive, however, and no one method has been shown to remove all bioactive agents. Therefore, some researchers advocate measures to prevent pharmaceuticals from ever entering the water system.

Pharmaceutical companies can and should use such "green" chemical techniques to design drugs that biodegrade quickly in the environment. But until drugs are truly environmentally friendly, research into their distribution and effects carries on.

Source:
http://www.the-scientist.com/?articles.view/articleNo/43615/title/Drugging-the-Environment/

Tea tree oil for head lice

Tea tree oil, also known as melaleuca oil, is an essential oil obtained from the distillation of the leaves from the Australian tea tree (*Melaleuca alternifolia*). Several products containing tea tree oil, including shampoos, body washes, drops, and sprays, are promoted as preventing and treating lice infestations.

Tea tree oil contains two major constituents: 1,8-cineole and terpinen-4-ol, which have insecticidal activity, possibly due to inhibition of acetylcholine

esterase. A 1% tea tree oil solution was found to kill 100% of head lice (*Pediculus humanus capitis*) within 30 minutes, in vitro.

One study evaluated the effect of tea tree oil and other interventions for preventing transmission and repelling head lice on isolated human hair and skin. While none of the interventions were effective for preventing lice transmission from one hair to another, tea tree oil appeared to have a repellant effect. In this study, a patch of skin was treated with 100% tea tree oil. Two minutes after treatment application, a louse was placed on the treated skin patch. Tea tree oil repelled 55% of the lice from the treated area, which was superior to other interventions, such as peppermint oil (34%) and N,N-diethyl-3-methylbenzamide (DEET) (26%). Similarly, tea tree oil also prevented 60% of the lice from feeding on the treated skin.

A second study compared three products in 123 children with active head lice: a combination product containing 10% tea tree oil and 1% lavender oil, a product containing pyrethrins and piperonyl butoxide, and a "suffocation" product containing benzyl alcohol, mineral oil, and other ingredients. The tea tree oil and suffocation products were each applied weekly for a total of three applications (days 0, 7, and 15). The product containing pyrethrins was applied twice, on day 0 and day 7, per the manufacturer's recommendations. At the end of treatment, the louse-free rate was 97.6% for patients who received the tea tree oil and lavender oil product and for those who received the suffocation product. The rate was 25% for those who received the product containing pyrethrins. The tea tree oil and lavender product was significantly more effective than the product containing pyrethrins, but was comparable to the suffocation product. The tea tree oil and lavender oil product was well tolerated except for few side effects including stinging on the skin, flaky or dry scalp, erythema.

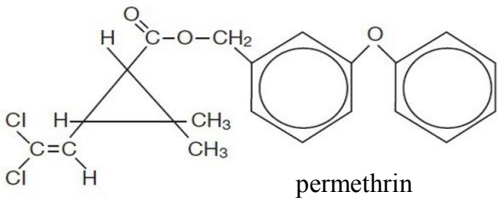
In another study, ovicidal efficacy was assessed for three products: tea tree oil plus lavender oil, eucalyptus oil plus lemon tea tree oil, and a suffocation pediculicide containing benzyl alcohol, mineral oil, and other ingredients. The suffocation product prevented hatching of 68.3% of live eggs; the tea tree oil and lavender oil product prevented hatching of 44.4% of eggs; and the eucalyptus oil and lemon tea tree oil preventing hatching of 3.3% of eggs.

In conclusion, constituents in tea tree oil appear to have activity against lice *in vitro*. Preliminary

evidence shows their repellent and antifeeding effects and their elimination of active lice, but not unhatched lice eggs. With more evidence, this combination product may prove to be an alternative treatment for addressing head lice, especially in circumstances of resistance to standard therapies.

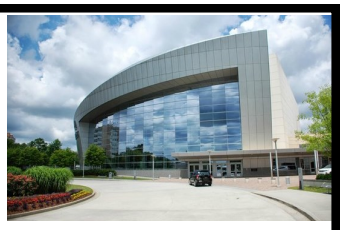
Guidance from the American Academy of Pediatrics (AAP) currently recommends against the use of natural products, including tea tree oil, for the eradication of head lice.

AAP recommends 1% permethrin (eg, Nix®) or pyrethrins (eg, RID®) as a first choice. In cases where resistance is proven or the parent does not wish to use a pediculicide, manual removal of lice either through wet combing or the use of an occlusive method with petroleum jelly or Cetaphil® is recommended.



permethrin

Advice from Centre for Disease Control



Quick facts about stroke

- More than 795,000 people suffer a stroke in the US annually. About 610,000 are first or new strokes
- About 185,00 strokes each year -nearly 1/4 - happen to people who have already had a previous stroke
- Stroke kills almost 130,000 Americans each year- that's 1 out of every 19 deaths
- On average, an American dies from stroke every 4 min
- About 55,000 more women than men have a stroke each year
- Women have a higher lifetime risk for stroke than men because they live longer, on average. Women are also more likely to die from a stroke.

Some risk factors for stroke unique to women:

- History of gestational diabetes
- History of preeclampsia
- Use of oral contraceptives
- Use of hormone therapy during or after menopause

In addition, some risk factors that men and women share are more common in women than in men. These include having migraines with aura, atrial fibrillation, and diabetes. AHA/ASA convened an expert panel to examine the research on sex differences and stroke and develop guidelines for preventing stroke specifically for women. The panel developed an extensive set of guidelines, including recommending that women be screened for high blood pressure before starting birth control pills and be screened for pregnancy risk factors such as preeclampsia. The panel noted that women who smoke and experience migraines with aura should be advised to quit smoking because of their greater risk of stroke. The panel also advised that all women aged 75 y or older be screened for atrial fibrillation.

Recognise Stroke F.A.S.T.

F—Face: Ask the person to smile. Does one side of the face droop?

A—Arms: Ask the person to raise both arms. Does one arm drift downward?

S—Speech: Ask the person to repeat a simple phrase. Is their speech slurred or strange?

T—Time: If you observe any of these signs, call the local emergency telephone number immediately

Quick treatment is critical for stroke: act F.A.S.T.

IN THE NEWS

Tamoxifen continues to shine for breast cancer prevention

Five years of tamoxifen continues to prevent breast cancer from developing in women at high risk for the disease, more than 15 years after they stopped taking it.

Median 16y follow-up results show a 29% lower risk for developing breast cancer among women who had been randomly assigned to five years of tamoxifen than for women assigned to five years of

placebo. The median age at enrollment was 51y.

The most pronounced reductions in risk were seen for invasive estrogen-receptor-positive (ER+) breast cancer and ductal carcinoma in situ. However, tamoxifen did not significantly reduce the risk for invasive estrogen-receptor-negative (ER-) breast cancer. Hormone replacement therapy turned out to be important. Women who did not use hormone replacement therapy had a much bigger benefit from tamoxifen than those who did both in the first 5 years and subsequently afterward.

Side effects

Endometrial cancer, a known risk of tamoxifen therapy, was seen in 20 women in the placebo group and in 29 in the tamoxifen group. The cases all occurred during the active treatment period. The difference between the groups was not significant, however.

A somewhat unexpected event is that a large increase in non-melanoma skin cancer was seen so it raises the question of any mechanisms by which tamoxifen might be causing this type of cancer. In contrast, the risk of colorectal cancer, previously thought to be of concern with tamoxifen therapy, was lower among patients on the active drug.

Many at-risk women don't get tamoxifen

Despite the evident benefits of tamoxifen in decreasing the risk of cancer by 50%, many women with a family history or genetic background that put them at risk for cancer but are otherwise healthy don't take the drug due to the fear of side effects, a persistent problem that troubles investigators and clinicians alike.

Clinicians and patients should be educated as to the fact that in pre-menopausal women, tamoxifen does not lead to an increased risk of endometrial cancer or either deep venous thromboembolism or pulmonary embolism. Note that below age 55y, the risk for endometrial cancer with tamoxifen is no higher than for the general population.

Source

http://www.medscape.com/viewarticle/836478?nlid=725 43_18 42&src=wnl_edit_medp_wir&spon=17

New $65m anti-malaria push to protect 50m through affordable home spray

A new $65 million initiative to boost malaria control and combat resistance to insecticides by improving access to new, low-cost anti-mosquito sprays across Africa was announced in Feb 2016.

The initiative by the health agency UNITAID and non-profit group IVCC will be rolled out over four years with a goal of protecting as many as 50 million people in 16 African countries.

Although effective in fighting malaria, the indoor spraying of walls has fallen by 40% in the past four years due to increased resistance to older products and high cost of new alternatives.

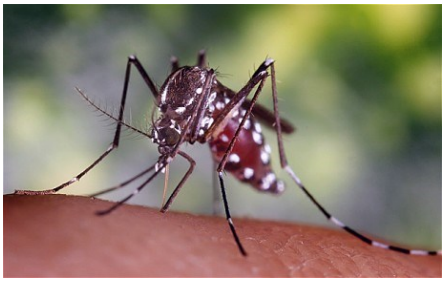
Unabated resistance could lead to120,000 more deaths annually from malaria.

The new project will initially use financing from UNITAID to lower the price of new products with a long-term goal of bringing down prices by encouraging competition.

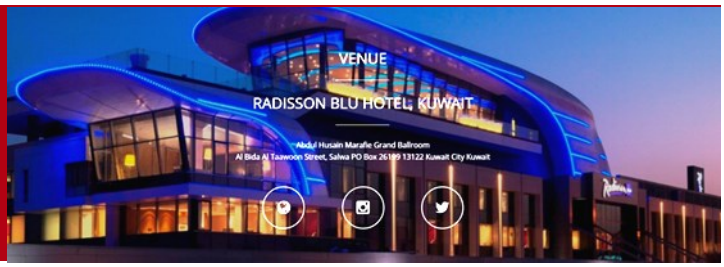
Malaria prevention measures have averted millions of deaths and saved millions of dollars in healthcare costs over the past 14 years in many African countries, according to WHO.

In the past five years, 60 of the 78 countries that monitor insecticide resistance have reported mosquito resistance to at least one insecticide used in nets and indoor spraying.

In December, 2015 WHO's annual malaria report showed deaths falling to 438,000 in 2015 - down dramatically from 839,000 in 2000 - and found a significant increase in the number of countries moving towards the elimination of malaria. The UN wants to cut new cases and deaths from malaria, a parasitic mosquito-borne infection, by 90% before 2030.



Report on 6th Kuwait International Pharmacy Conference



The sixth Kuwait International Pharmacy Conference (KIPC) was held from February 9th to 11th, 2017 at the Radisson Blu Hotel in Kuwait. The bi-annual conference included keynote lectures, given by distinguished speakers from North America and Europe, along with workshops designed and delivered by academic members from the participating pharmacy schools of the Gulf region. This programme was complemented by poster presentations and various social activities aimed at facilitating interactive networking among the participants. The main goal of the conference was to provide up-to-date knowledge, and support the participants to advance the quality of pharmacy and pharmaceutical education in Kuwait and around the world.

Conference Topics

The intensive three-day scientific program which encouraged the pharmaceutical professionals to evolve and enhance their education levels for an improved understanding of pharmaceutical care was presented through the following topics:

- Fostering the development of community / ambulatory pharmacy practice through education and practice experience activities
- Development of Competency-based curriculum
- Educational activities to prepare students for life-long learning
- Assessment of teaching and learning
- Simulation-based educational activities
- Assessment of student performance during learning activities (professional and soft skill assessment)

- IPE: How much is enough?
- Team teaching in integrated courses
- Integrating research skills and developing research-based curriculum in pharmacy education
- Leadership and management integrated courses

In addition to the above-mentioned topics, undergraduate and postgraduate students were given the opportunity to submit abstracts in the theme of the conference. Some of the sessions were interspersed with group activities and discussions which enhanced learning and facilitated networking, as well as finding solutions to the challenges identified during the discussions. This made the content of the workshops interesting and relevant.

There were four workshops for the following topics:

- Development of competency-based curriculum.
  (*Dr. K Wilby, Prof. P Moreau, Prof. Ahmad AN Alghamdi, Dr. A Saad, Dr. M Cherfan*)
- Educational activities to prepare students for Life-long learning.
  (*Dr. S Pawluk, Dr. J Lemay, Dr. S Waheedi, Dr. B Balki, Dr. L Karaoui, Dr. D Hammoudi*)
- Assessment of student performance during active learning activities.
  (*Dr. M Cherfan, Dr. L Soubra, Dr. M Alowayesh, Dr. A Alhammad, Dr. B Javed*)
- Team teaching in integrated courses.
  (*Dr. B Qabazard, Dr. S. Munusamy, Dr. M Issa, Dr. D Hammoudi*)

Plenary Lectures

Importance of competencies in education

Dr. Arijana Mestrovic
Biomedical Sciences
Croatia

The context, structure and process of educational activities in pharmacy have been transformed in the dynamic continuum of changes in pharmacy profession. New generations are learning in more interactive environments, where scientific data is easily accessible and widely taught, but there is a tremendous need for sharing practical examples, application reasoning and clear guidance, on how to apply knowledge into everyday practice. Both in continuing education and undergraduate learning, there is emerging the need to define the desired competencies that learners should achieve as the result of learning.

Competencies in pharmacy profession are more than outcomes of learning; they are the ability of students and healthcare professionals to use and en-

engage all resources of their knowledge, skills, attitudes and values to perform on desired level, professionally. Quality of education leads to quality of services and patient care if competencies are well defined and developed. Many initiatives tried to promote competency based educational model both for undergraduate and life-long learning, but it is still in development. Despite the differences in educational activities, teaching methods and pharmacy programs internationally, everyone should have the same goal to develop pharmacists' competencies.

Life-long learning education for pharmacy students

Dr. Michael J. Rouse
Assistant Executive Director, Professional Affairs, and Director, International Services
Accreditation Council for Pharmacy Education, USA

Maintaining competence throughout a career, during which new and challenging professional responsibilities will be encountered, is a fundamental ethical requirement for all health professionals. Pharmacists acknowledge this need and evidence suggests that most pharmacists are willing and committed to maintaining their competence.

Away from the structured, directed learning environment of pharmacy school, a commitment to life-long learning requires a different approach and more self-direction by the learner. After graduation, learning must be ongoing, systematic, outcomes-focused, relevant to daily practice and needs-based to ensure that it achieves its objectives of practitioner development, enhanced professional performance and practice, and ultimately improved patient care. The presentation discussed the continuing professional development (CPD) approach to life-long learning, how CPD concepts and principles apply throughout the continuum of learning for students and pharmacists, what specific skills and attitudes must be developed in students, and how these skills and attitudes can be fostered and assessed in a contemporary pharmacy degree program.

Selection of posters presented at the conference by the Kuwait Faculty of Pharmacy

Buresli L, Lemay J, AlSaleh F, Abahussain E, Bayoud T: Knowledge, Attitudes and Practices on Pharmacovigilance and Adverse Drug Reactions of Primary Care physicians in Kuwait.

Al-Mutairi M, Lemay J, AlSaleh F, Abahussain EA, Bayoud T: Knowledge, Attitudes and Practices on Pharmacovigilance and Adverse Drug Reactions of Pharmacists Care Pharmacists in Kuwait

Al-Hasawi N, Novotny L, Phillips O, Luqmani Y, Abdul-Hamid M, Orabi K, Al Tannak N: Students' performance in courses of Department of Pharmaceutical Chemistry

AlSharqawi S, Lemay J, Abahussain E, Bayoud T, Waheedi M: Beliefs about Medications: A Kuwait Perspective

Katoue MG, Baghdady M, Rassafiani M, Al-Jafar E, Bouzubar F, Moreau P: Development of Competency-based Inter-professional Education Curriculum at the Health Sciences Centre of Kuwait University.

Al-Dhafeeri RR, Alsaleh FM, Abahussain EA, Lemay J, Bayoud T: Knowledge and awareness of pharmacovigilance and adverse drug reactions (ADRs) among physicians in Kuwait

AlAjmi SH, Alsaleh FM, Abahussain EA, Lemay J, Bayoud T: Knowledge, Attitude and Practice toward Pharmacovigilance and Adverse Drug Reactions Reporting among Private Hospital Physicians in Kuwait.

Alzaid SW, AlSaleh FM, Abahussain EA: Knowledge, attitude and practices of pharmacovigilance and adverse drug reaction reporting among pharmacists working in secondary/tertiary hospitals in Kuwait

Eldeeb AM, Muir F, Waheedi M: Barriers to pharmacists counselling patients with diabetes in primary health care sector in Kuwait.

At the farewell dinner

STATE OF KUWAIT
Pharmaceutical & Herbal Medicines Control and Registration Administration

New Pharmaceutical products approved from November 2016 to August 2017

Alecensa Capsules; Alectinib – 150mg; F. Hoffmann-La Roche Ltd./Switzerland
Beclomet Nasal Spray Suspension; Beclometasone dipropionate - 50 µg/dose; Orion Corporation/Finland
Bosentor Tablets; Bosentan (as Monohydrate) – 62.5mg; Pharmascience Inc./Canada
Bosentor Tablets; Bosentan (as Monohydrate)– 125mg; Forest Laboraories UK Limited/UK
Cefuroxime Kabi Powder for Solution for Injection/Infusion; Cefuroxime (as sodium) – 750mg; Fresenius Kabi Deutschland GmbH Bad Hamburg/Germany
Ciprofloxacin I.V. Infusion 0.2% w/v; Ciprofloxacin – 200mg; Gulf Pharmaceutical Industries (Julphar)/ UAE
Clarikern Film Coated Tablets and Extended Release Tablets; Clarithromycin (as Citrate) – 500mg; Kern Pharma, S.L./Spain
Clonotril Tablets; Clonazepam – 2mg; Remedica Limited/Cyprus
Cotellic Film Coated Tablets; Cobimetinib as hemifumarate – 20mg; F. Hoffmann La Roche Ltd./ Switzerland
Coxicel Capsules; Celecoxib – 200mg; Laboratorios Cinfa, S.A./Spain
Elica Ointment; Mometasone Furoate – 0.1%w/v; Jamjoom Pharmaceuticals Company Ltd./Saudi Arabia
ELOCTA Powder and solvent for solution for injection; Efmoroctocog alfa (rDNA) – 250, 500, 1000,1500, 2000, 3000 IU; Swedish Orphan Biovitrum AB (publ)/Sweden
Epicitam Oral Solution; Levetiracetam – 100mg; Neopharma/UAE
Gablix Hard Capsule; Pregabalin – 75, 150, 300mg, Laboratorios Cinfa S.A./Spain
Gaviscon Advance Peppermint Oral Suspension, Potassium Hydrogen Carbonate – 200mg Sodium Alginate – 1000m; Reckitt Benckiser healthcare (UK) Limited/UK
Gaviscon Infant Powder for Oral Solution; Sodium Alginate – 225mg Magnesium Alginate – 875mg; Reckitt Benckiser healthcare (UK) Limited/UK
Gordex Delayed Release hard gelatin-capsules; Ezomeprazole (as magnesium dihydrate) – 20, 40mg; Gulf Pharmaceutical Industries (Julphar) /UAE
Heberprot P 75 Injection; Lyophilized Human recombinant Epidermal Growth Factor (RDNA) – 0.075mg/unit dose; Heber Biotec S.A/.Cuba Co.
Nebilet Plus Film Coated Tablets (5mg/12.5mg); Nebivolol (as HCl) – 5mg Hydrochlorothiazide – 12.5mg; Menarini International Operations Luxembourg S.A./Luxermbourg
Nebilet Plus Film Coated Tablets (5mg/25mg); Nebivolol (as HCl) – 5mg Hydrochlorothiazide –25mg; Menarini International Operations Luxembourg S.A./Luxermbourg
Negafen Tablet; Terbinafine (as HCl) – 250mg; Gulf Pharmaceutical Industries (Julphar)/UAE
Neolyte Powder for Oral Solution (30gm); Sodium Chloride – 3.5gm, Potassium Chloride – 1.5gm, Sodium Citrate – 2.9gm, Anhydrous Glucose -20gm; Neopharma/UAE
Olzan Film Coated Tablets; Olanzapine -5mg; Dar Al Dawa Development and Investment Co/Ltd./Jordan
Otrivin Complete Nasal Spray Solution; Ipratropium bromide (as monohydrate) – 0.60mg Xylometazoline HCl – 0.50mg; Novartis Sverige AB/Sweden
Qpime Powder for Solution for Injection; Cefepime (as HCl) – 2000mg; Gulf Pharmaceutical Industries (Julphar) /UAE
Rothacin Suppositories; Indomethacin – 100mg; Gulf Pharmaceutical Industries (Julphar) /UAE
Spiolto Rspimat Inhalation Solution; Tiotropium (as Bromide Monohydrate) – 2.5µg Oladaterol (as Hydrochloride) - 2.5 µg; Boehringer Ingelheim International GmbH/Germany

Answers to: Test your knowledge

Correct answers:
1-D; 2-C; 3-A

The *Kuwait Pharmacy Bulletin* (ISSN 1028-0480) is published quarterly by the Faculty of Pharmacy, Kuwait University, and includes a list of recently approved drugs from the MOH. It aims to provide instructive reviews and topical news items on a range of drug related issues. It is widely distributed free within the university, to hospitals, polyclinics & private pharmacies as well as to other universities within the Gulf & Middle East region.

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