



Pharmaco Logical

The Newsletter of the Rational Use of Medicines Directorate
Ministry of Health, Sultanate of Oman

Volume 5 Number 2, September 2009

Welcome to the tenth issue of our newsletter. At time of writing novel influenza A, H1N1 or “swine flu” is still the hottest medical topic of 2009 with many different predictions for Oman and the rest of the world in the coming months (the ‘normal flu’ season). In this newsletter we felt it timely to include an article on oseltamivir (Tamiflu®) and the recommended doses for ‘treatment’ (actually, palliation) or prophylaxis.



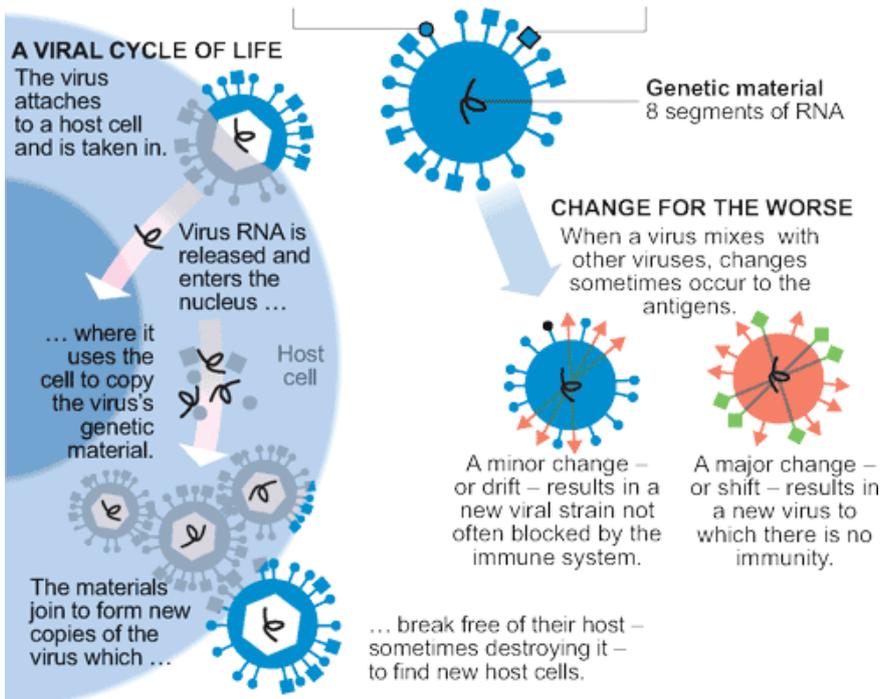
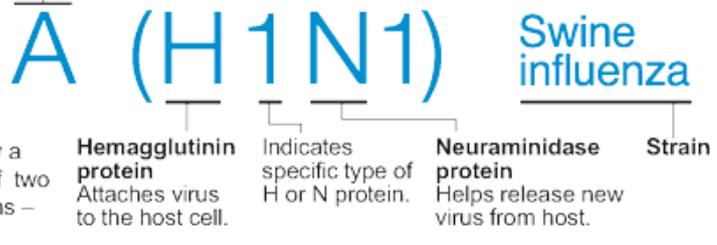
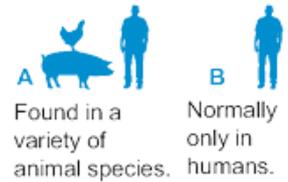
There is also an article about the use and effectiveness of various types of face masks. In addition the potential dangers of prescribing and dispensing the liquid form of oseltamivir is included as a recent warning from the FDA

Decoding a virus

A virus's ability to subtly or dramatically change into a new strain – such as in the current influenza pandemic – keeps officials looking at its origin for answers.

WHAT'S IN A NAME

Virus type
Of the three types – A, B and C – the first two are the most common causes of epidemics.



Sources: Centers for Disease Control and Prevention; “The Merc Manual;” Florida State University

Oseltamivir or Tamiflu®

by Ph Batool Jaffer Suleiman

Oseltamivir phosphate is an antiviral drug and is most commonly known by its trade names Tamiflu®. The drug has been shown to alleviate some of the worst symptoms of swine influenza (swine flu) or novel H₁N₁ by preventing or slowing replication of sensitive viruses. Since its first use resistant viral strains have emerged.

Mechanism of Action

Oseltamivir is a neuraminidase inhibitor. It acts as a transition-state analogue inhibitor of influenza neuraminidase, preventing progeny virions from detaching from infected cells.

Therapeutic Indications

The medicine is indicated to treat adults and children (over 1 year) who have had symptoms of the flu for no longer than 2 days (48 hours). The drug can also be used prophylactically but whoever takes the drug should be

already in a high risk situation or in close contact with someone already having the flu. Taking the drug

without good cause could result in failure to treat if the disease is encountered at a later time or even bring about infection with a resistant strain of the virus. In UK there is controversy over whether to treat children with oseltamivir. The government wants them to be treated for safety reasons but many GPs claim the drug is of little use and the side effects can be severe.



How is 'swine flu' or novel influenza A, H1N1 diagnosed?

Flu symptoms:

- **Fever (higher than 38° C)**
A fever occurs when your body temperature increases in response to illness or injury. Your temperature is considered elevated when it is higher than 38°C.
- **Chills**
Body chills that are not related to a cold environment can be a sign

of the flu.

• **Headache**

A headache associated with the flu may appear suddenly, and be related to body aches or nasal congestion you're experiencing.

• **Extreme tiredness**

It's normal to feel tired at the end of a long day or when you don't get adequate sleep, but unexplained tiredness can be a sign of the flu.

• **Dry cough**

Know your cough. A productive cough (coughing up mucus) is common with a cold, while a non-productive or dry cough (with no mucus) is associated with the flu.

• **Sore throat**

Swelling in the throat can lead to a sore throat.

• **Runny nose**

Runny nose may also occur but is more common in children than adults.

• **Muscle aches**

While it is normal to feel body aches from physical overexertion, body aches that are sudden and unexplained can be a sign of the flu.

• **Stomach symptoms**

Stomach symptoms such as nausea, vomiting and diarrhoea are more common in

Body Weight (kg)	Body Weight (lbs)	Age	Recommended Treatment Dose for 5 Days
Dosing for infants younger than 1 year is not based on weight Use TAMIFLU for Oral Suspension (12 mg per mL).		< 3 months	12 mg twice daily
		3-5 months	20 mg twice daily
		6-11 months	25 mg twice daily
< 15 kg	< 33 lbs	1-2 year	30 mg twice daily
> 15 kg to 23 kg	> 33 lbs to 51 lbs	3-5 years	45 mg twice daily
> 23 kg to 40 kg	>51 lbs to 88 lbs	6-9 years	60 mg twice daily
>40kg	> 88 lbs	10-12 years	75 mg twice daily
Dosing for adults and teenagers 13 years and older is not based on weight.		13 years and older	75 mg twice daily

children than in adults

• **Chest discomfort**

Chest discomfort is often severe with the flu.

Dosage

Adults:

One capsule (75mg) twice daily for 5 days for treatment

One capsule (75mg) daily for 10 days for prophylaxis

Children:

(see table above)

Time taken after flu symptoms appeared (normally should be within 48 hours).

(see check list of symptoms above)?

Side Effects

Symptoms reported or discovered for oseltamivir:

CNS or psychological symptoms

e.g. self harm, odd behaviour, delirium, confusion, hallucinations, anxiety, insomnia, dizziness, vertigo, irritability

GIT symptoms

nausea, vomiting, dyspepsia, diarrhoea

Skin

skin rashes or eruptions

Respiratory

chest pain

Potential Dosing Errors with Oseltamivir Oral Suspension

All prescribers and pharmacists should be aware of the potential for medication errors with the oral suspension of oseltamivir. Medicines are usually dispensed in mL but the dosing dispenser issued with Tamiflu® brand oseltamivir is only calibrated in milligrams (30, 45 and 60mg). The danger arises when the prescribing instructions to the patient do not match the dosing dispenser. Health care providers should write doses in milligrams if the dosing dispenser is in milligrams. Pharmacists should ensure that the units of measure on the prescription match with dosing device provided to the patient.

Reference:

FDA Public Health Alert 24/9/09

New Discoveries in Antibacterial Resistance Research

Recent work from the US and published in *Science*, has uncovered a defence mechanism in bacteria which allows them to fend off the threat from antibiotics. The study found that the bacteria produced nitric oxide (NO) which eliminated the effect of the antibiotics. The nitric oxide was produced specifically in response to the presence of the antibacterial drug. The NO alleviates damage caused by the antibacterial agent as well as

neutralising further cytotoxic effects.

The researchers showed that inhibiting the production of nitric oxide allowed the antibiotics to work and at lower than normal doses.

This research could have a profound effect on the future of antibacterial research. Because the discovery of new antibacterial agents has slowed down to a trickle, new drugs which inhibit nitric oxide production by the bacteria could allow some established antibiotics to be useful again.

Shisha ‘as harmful as cigarettes’

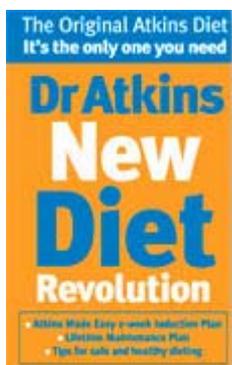


Shisha smoking is a very common phenomenon in most of the Middle East and somewhat in Oman. It has recently spread out to other parts of the world e.g. London and Birmingham in the UK. It is seen as a trendy social activity by many groups of people. Shisha is a water pipe in

which fruit-scented tobacco is burnt using charcoal and the smoke is passed through an ornate water vessel and inhaled via a hose. Another type of pipe smoking in Oman is known as *gadou*. Researchers in the Ministry of Health in Oman have conducted a survey and published a report which is available on the MOH website together with an excellent poster which has appeared in most local health facilities (*see image above*).

The latest research has shown that people who smoke shisha can suffer from higher carbon monoxide levels at least 4-5 times and possibly up to 400 -500 times higher than by smoking cigarettes. High levels of carbon monoxide are known to lead to brain damage and unconsciousness. Many people who smoke shisha do not even regard themselves as smoking or, at the least, think it is much safer than smoking.

Low-carbohydrate diets may damage arteries.



Perhaps the best known diet based on a low daily intake of carbohydrate is the Atkins Diet.

This diet became very popular from the end of the 1990s until about 2004 when it started to decline. By restricting carbohydrates, the diet converts the body to a state of ketosis where fats are used for energy instead of glucose and starch. This results in fairly dramatic and rapid weight loss but over time about the same as a reduced fat intake diet. The main advantage of the Atkins diet was that participants rarely felt the hunger and depression that accompanies many other types of diet. This is largely due to the increased intake of protein and fat which has a longer lasting effect. Like most diets the low carbohydrate diet has always been controversial as to its safety and long terms effects.

Recent research in mice has shown that the animals on a low carbohydrate diet had developed a significant increase in atherosclerosis compared to those on standard mouse food. The effect seems to be on certain bone marrow cells which effectively clear fatty deposits from the arterial walls.

The researchers conclude that low carbohydrate diets could be having adverse cardiovascular effects and advise that a well balanced diet coupled with regular exercise is the key method to regulate body weight.

Recommended Websites

NHS Choices is a free access website from the National Health Service (NHS) of the UK. Registration is free and allows you to save various pages on-line. The website evolved to establish the 'truth' behind sensational



headlines in the popular media. Each story is checked and evaluated for research work that contributed to the story. The result is a fairly balanced overview about popular medical news stories.

<http://www.nhs.uk/News/Pages/NewsArticles.aspx?TopicId=Medication>

Although news about medicines is very common the website covers many other health related news.

- Categories**
- All Headlines
 - Food/diet (240)
 - Lifestyle/exercise (237)
 - Pregnancy/child (209)
 - Cancer (203)
 - Medication (172)**
 - Heart/lungs (157)
 - Neurology (123)
 - Medical practice (112)
 - Older people (93)
 - Obesity (87)
 - Genetics/stem cells (85)
 - Mental health (65)
 - Diabetes (50)
 - QA articles (39)
 - Swine flu (22)

Illustrated case studies-2

by Dr Hawraa Al-Lawati

Case 1:

A 35 years old lady presented to her primary medical doctor with chief complaint of insomnia and nervousness. Physical examination reveals tachycardia, hand tremor, exophthalmos (abnormal protrusion of the eyeball) and her skin was warm and moist. Upon palpation the thyroid gland appeared slightly enlarged, uniform and without palpable masses. Thyroid function test reveals elevated thyroxine (T_4) and slightly decreased thyroid stimulating hormone (TSH). Diagnosis of Graves disease was made and the patient was treated with propylthiouracil and propranolol.



1. Symptoms of hyperthyroidism include all of the following except:

A. Tachycardia

- B. Nervousness
- C. Poor resistance to cold
- D. Body wasting
- E. Tremor

2. Which of the following best describes the effect of propylthiouracil on thyroid hormone production?

- A. It blocks the release of thyrotropin releasing hormones
- B. It inhibits uptake of iodide by thyroid cells
- C. It prevents the release of thyroid hormone from thyroglobulin
- D. It blocks iodination and coupling of tyrosines in thyroglobulin to form thyroid hormones
- E. It blocks the release of hormones from the thyroid gland

3. Hyperthyroidism can be treated by all but which one of the following?

- A. Tri-iodothyronine
- B. Surgical removal of the thyroid gland
- C. Iodide
- D. Propylthiouracil
- E. Carbimazole

4. Which of the following drugs can induce hyperthyroidism?

- A. Amiodarone
- B. Digoxin
- C. Aspirin
- D. Methimazole
- E. Propranolol

Case 2:

A 30-year-old man presented to his GP with a sore throat that had developed during the past week. The patient was otherwise healthy, with no significant medical history. Physical examination revealed a red throat with white patches and enlarged tonsils. Tender cervical lymphadenopathy was noted. A positive "rapid strep test" indicated the presence of streptococcal bacteria, and the patient was prescribed penicillin V, which he began taking immediately.

The next day, the patient went to his local hospital emergency department with itchy oedematous red bumps that had developed during the previous 24 hours, that lasted for several hours, and that were followed by crops of new lesions.

A diagnosis of penicillin-induced urticaria was established, and the administration of penicillin was discontinued. The rash was treated with hydroxyzine, and the antibiotic was changed. The urticarial lesions gradually resolved during the next 7 days.



E. All of the above

Answers:

Case 1:

1. C

D

1. In addition to urticaria, which of the followings are other types of drug induced skin reactions :

- A. Maculopapular xanthema
- B. Stevens-Johnson syndrome
- C. Toxic Epidermal Necrolysis
- D. Angioedema
- E. All of the above

2. Which drug(s) is/are capable of developing urticaria:

- A. Penicillin
- B. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)
- C. ACE inhibitors
- D. A+B
- E. All of the above

3. Which of the following can be considered in the management of an acute allergic reaction manifested by acute urticaria or angioedema:

- A. Administration of adrenaline
- B. Administration nebulised beta2 agonist
- C. Use of Antihistamines or Corticosteroids
- D. A+C

3. A (*Tri-iodothyronine is a thyroid hormone that is overproduced in hyperthyroidism*)

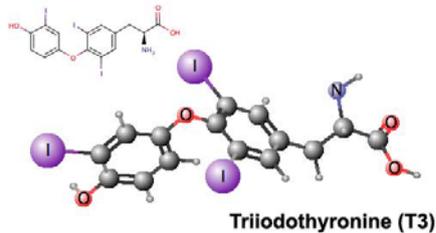
4. A (*Amiodarone which contains 37% of iodine, can induce hyperthyroidism through two different mechanisms: thyroid destruction due to an iodine associated increase in circulating interleukin-6 or an increase in thyroid hormone synthesis*)

Case 2:

1. E

2. E

3. E



References:

- 1- Lippincott's Illustrated Reviews: Pharmacology, Mary J. Mycek; Richard A. Harvey; Pamela C. Champe (Ed). 2nd edition. Lippincott-Raven. Philadelphia. New York, US. 1997
- 2- 250 Cases in Clinical Medicine, R.R Baliga. 3rd edition. W.B. Saunders Company LTD. London, Philadelphia, Toronto, Sydney, Tokyo. 2002
- 3- Drug-Induced Dermatologic Reactions: A Case History-Based Review, <http://cme.medscape.com/viewarticle/517335>

DRUM Roll

Courses & Workshops

April 2009

Public Health Campaign, Wilayat, Bausher

April 2009

Workshop for GPs and pharmacists on Rational Prescribing and Use

May 2009

Pharmacists workshop on Good Pharmacy Practice

June 2009

Promoting RUM in the community

July 2009

One day induction course in rational prescribing for medical interns from SQU, OMC plus 8 Omanis attending international universities

August 2009

Workshop for pharmacists on field research methods

Research Completed:

- Pharmaceutical care with olanzapine
- National Household Survey on medicine use
- Survey of Nurse Prescribers
- National Study of Consultation and Dispensing Times in PHC

Publications:

KAP Study on Patient Knowledge, SQU Medical Journal, August 2009

Perioperative Use of Antibiotics in LSCS Surgery in 4 Omani Hospitals, submitted to Oman Medical Journal, August 2009



**Combined GP Pharmacist Workshop
Wattaya 2009**

Medical Facemasks and Respirators

by Dr Hawraa Al-Lawati

Introduction:



Facemasks are becoming a common sight around the world especially with the outbreak of the novel H1N1 last April. They are intended to be worn by health professionals but it is notable that even people in the general public tend to wear facemasks. In this article, some aspects relevant to the facemasks effectiveness and use will be discussed.

Definition:

Medical facemasks and respirators are disposable medical devices that create a physical barrier between the mouth and nose of the wearer and the potential contaminants in the immediate environment and at the same time to protect others from catching germs shed in liquid droplets and aerosols from the wearer's mouth and nose.

It is important to say that facemasks and respirators do not provide complete protection from airborne germs and other contaminants. They are one part

of an infection-control strategy that should also include frequent hand washing, social distancing, and staying home when sick.

Differences between a facemask and a respirator:

There are important differences between facemasks and respirators. Facemasks (labelled as surgical, dental, medical procedure, isolation, or laser masks) do not seal tightly to the face and are used to block splashes, sprays and large droplets from coming into contact with the wearer's mouth or nose. On the other hand, most respirators are designed to seal tightly to the wearer's face to ensure that infectious droplets do not leak around the mask. They also have the capability to filter out very small particles that may contain viruses e.g. N95 respirators are $\geq 95\%$ efficient at filtering $0.3\mu\text{m}$ particles (smaller than the $5\mu\text{m}$ size of large droplets created during talking, coughing, and sneezing which usually transmit influenza), but compared with a facemask it is harder to breathe through a respirator for long periods of time. Respirators are not recommended for children, people who have facial hair or people with chronic respiratory and cardiac conditions. Moreover, respirators tend to be more expensive.

Keeping in mind that the swine flu virus is of (nano) size and there are very limited data and scientific studies on the effectiveness of facemasks and respirators in preventing transmission of H1N1 or seasonal influenza, it is clear that even a properly fitted N95 respirator does not completely eliminate the risk of illness or death.

However, the use of a facemask or respirator is likely to be of most benefit if used as early as possible when exposed to an ill person and when the facemask or respirator is used correctly and consistently.



N95 Respirator

Indications:

Generally, medical facemasks and respirators are intended to be worn in the health care facilities. In community and home settings, the use of facemasks and respirators is not recommended. However, for certain circumstances, in crowded settings in areas where transmission of swine influenza A (H1N1) virus has been confirmed or close contact with others cannot be avoided, the use of face masks or respirators should be considered.

The table below includes the recommendations of the CDC (Centres for Disease Control and Prevention) for facemask and

respirator use for home, community, and occupational settings for non-ill persons to

prevent infection with novel H1N1.

Setting	Persons not at increased risk of severe illness from influenza (Non-high risk persons)	Persons at increased risk of severe illness from influenza (High-Risk Persons)*
Community		
No novel H1N1 in community	Facemask/respirator not recommended	Facemask/respirator not recommended
Novel H1N1 in community: not crowded setting	Facemask/respirator not recommended	Facemask/respirator not recommended
Novel H1N1 in community: crowded setting	Facemask/respirator not recommended	Avoid setting. If unavoidable, consider facemask or respirator
Home		
Caregiver to person with influenza-like illness	Facemask/respirator not recommended	Avoid being caregiver. If unavoidable, use facemask or respirator
Other household members in home	Facemask/respirator not recommended	Facemask/respirator not recommended
Occupational (non-health care)		
No novel H1N1 in community	Facemask/respirator not recommended	Facemask/respirator not recommended
Novel H1N1 in community	Facemask/respirator not recommended but could be considered under certain circumstances	Facemask/respirator not recommended but could be considered under certain circumstances
Occupational (health care)		
Caring for persons with known, probable or suspected novel H1N1 or influenza-like illness	Respirator	Consider temporary reassignment. Respirator

***High-Risk Persons include:**

- Persons aged 65 years or older
- Children and adolescents (younger than 18 years) who are receiving long-term aspirin therapy and who might be at risk for experiencing Reye syndrome after influenza virus infection
- Pregnant women
- Adults and children who have asthma, chronic pulmonary, cardiovascular, hepatic, haematological, neurologic, neuromuscular, or metabolic disorders such as diabetes
- Adults and children who have immunosuppression (including immunosuppression caused by medications or by HIV)

Medical Facemasks and Respirators as a source of infections!

Using a mask incorrectly may increase the risk of transmission rather than reduce it.

It is important to understand that if you are exposed to infectious material while wearing a facemask or N95 respirator, it should be considered contaminated. Facemasks are not intended to be used more than once or to be shared. If your mask is

damaged or soiled, or if breathing through the mask becomes difficult, you should remove the facemask, discard it safely, and replace it with a new one. To safely discard your mask, place it in a plastic bag and put it in the trash. Wash your hands after handling the used mask.

References:

1. Interim Recommendations for Facemask and Respirator Use to Reduce Novel Influenza A (H1N1) Virus Transmission. Centres for Disease Control and Prevention.

<http://www.cdc.gov/h1n1flu/masks.htm>

2. Masks and N95 Respirators, Food and Drug Administration (FDA), <http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/MedicalToolsandSupplies/PersonalProtectiveEquipment/ucm055977.htm>

3. Advice on the use of masks in the community setting in Influenza A (H1N1) outbreaks, WHO, www.who.int/csr/resources/publications/Adviceusemaskcommunity.pdf

4. What size is the swine flu virus?, Wikipedia, http://wiki.answers.com/Q/What_size_is_the_swine_flu_virus

What should a dispenser check when receiving a prescription?

Read and check the prescription for:

- Legality and legibility
- Completeness and correctness of
 - Physicians and patient details
 - Product details
 - ✓ Name, form, strength /potency
 - ✓ Total amount to be dispensed
 - ✓ Dosage and directions for use
 - ✓ Frequency of administration
 - Adverse effects, interactions and contraindications

When does inappropriate prescribing occur?

- Prescribing drugs when none were needed or more than were needed
- Failure to prescribe the needed drugs
- Ineffective or unsafe drugs are prescribed
- Effective and available drugs are under prescribed
- Prescribing inadequate form, dosage or duration of the drug
- Prescribing expensive drugs when a less expensive equivalent exists
- No or unclear instructions were written

INFORMATION CAPSULES

By: Dr. Ahmed Abdo-Rabbo & Ph Manal Al-Ansari

Reconstituting antibiotic powder

Follow carefully the following steps

- Add accurate amount of clean water before the antibiotic can be used to:
 - get the correct strength
 - avoid contamination
- Write the date of reconstitution
- Write the new expiry date on the bottle
- Use the liquid preparation within
 - One week if stored in a room temperature, or
 - Two weeks if stored in a refrigerator
- Shake the bottle before use
- Close the bottle tightly after use

Peoples ideas about drug safety and efficacy

People believe that the safety and efficacy of drugs depend on:

- The colour and shape of medicine (e.g. red medicine good for blood)
- The method of administration (e.g. injections don't leave the body quickly)
- Compatibility between the drug and the person taking it
- "Newness" of a medicine (i.e. New medicines are more effective)

Dispensing Time at Primary Health Care Facilities in Oman

Dr. Ahmed Abdo-Rabbo, Ph. Manal Al-ansari

Introduction

The dispensing time (DT) is one of the core patient care indicators created and validated by World Health Organization (WHO) and International Network for Rational Use of Drugs (INRUD).

DT includes preparation of a prescription and interaction between patient and dispenser. There is no national standard DT, but the opinion of WHO the average DT should not be below 10 minutes (min). However, this may be overly optimistic and unachievable in practice. This study was aimed to assess the current DT in primary health care (PHC) facilities in Oman and its correlation with certain variables. DT is an essential element of RUM, since dispensing is the last point of contact that patients have with their health care providers.

Methods

A cross sectional prospective study was conducted among outpatients at various PHC facilities. Two willayat were selected from each of the 11 health region in Oman, then 2 PHC facilities from each willayat, one urban and one rural were selected by stratified random sampling for the study (a total of 44 PHC facilities). The DT of 100 patients per each facility (a total of 4400 dispensing encounters) was measured. DT was counted from the moment in which the patient arriving at the dispensary window and leaving it. The waiting time before the patient hands the prescription in to be filled was not counted. Also, any interruption was subtracted from the total DT. The average DT in seconds (sec) was calculated by dividing the total times for dispensing medicines to a series of patients by the number of patient encounters.

Results

The overall mean DT was 102.23 ± 90.49 sec. (range 30.20 - 351.00 sec). The following tables illustrate the overall mean of DT with the minimum (min) and maximum (max) found in the studied governorates/regions and PHC facilities. Also the correlation between the DT and the variables used in this study.

Table 1. DT in different governorates and regions

Governorate/ regions	Dispensing Time		
	Mean	Minimum	Maximum
Musandam	200.85	59.37	351.00
Dhofar	112.21	64.53	168.87
Al-Buraimi	81.32	30.20	100.22
S. Sharqiya	78.27	52.75	110.19
Al-Wosta	61.84	46.3	80.09
N. Sharqiya	74.92	48.9	115.57
Al-Dakhliyah	91.69	58.03	200.66
S. Batinah	124.18	93.05	199.74
Muscat	90.43	38.90	190.20
Al-Dhahira	89.18	85.24	93.62
N. Batinah	109.60	69.73	130.20

Table 2. The overall mean DT in Oman, the minimum and maximum in governorates/regions and facilities

DT (sec)	Govern./Region n = 11	Facilities n = 44
Overall Mean	102.23	
Min.	61.84 Al-Wosta	30.20 Al-Fayadh HC
Max.	200.84 Musandam	351.00 Kumzar HC

Table 3. The correlation between DT and the variables used in this study

Table 3.a. DT in urban vs. rural PHC facilities

DT (sec)	Facilities	
	Urban (n=20)	Rural (n=24)
Mean	97.29	106.55
Min.	38.90 Ruwi HC	30.20 Al-Fayadh HC
Max.	199.74 Awabi HC	351.00 Kumzar HC

Table 3.b. DT in facilities using electronic vs. paper prescription

DT (sec)	Type of prescription used	
	Electronic (n=26)	Paper (n=18)
Mean	93.41	115.94
Min.	38.90 Ruwi HC	30.20 Al-Fayadh HC
Max.	199.74 Awabi HC	351.00 Kumzar HC

Table 3.c. DT in facilities by different class of dispensers

DT (sec)	Class of dispenser		
	Pharmacist (n=1)	Assist. Pharmacist (n=37)	Nurse (n=6)
Mean	93.28	91.46	191.94
Min.	-	38.90 Ruwi HC	30.20 Al-Fayadh HC
Max.	-	200.77 Wadi Maharam HC	351.00 Kumzar HC

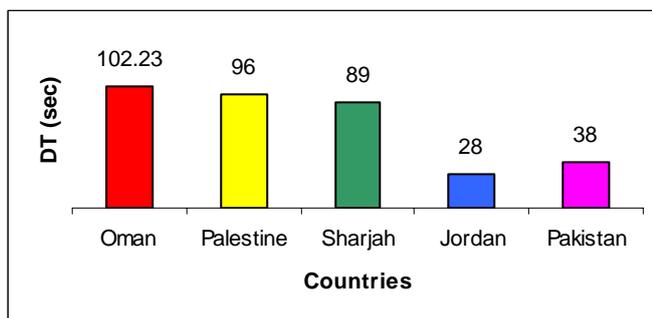
Table 3.d. DT vs. the average daily OPD visits

OPD visits (mean)	DT (sec)
< 30 (18.4)	127.56
from 30 to 60 (42.8)	90.12
> 60 (111.2)	82.21

Table 3.e. DT vs. the average number of medicines per prescription

Number of drugs/Rx (mean)	DT (sec)
≤ 2.5 (2.3)	96.89
> 2.5 - < 3 (2.7)	98.93
≥ 3 (3.4)	118.73

Fig 1. The average DT in Oman and in some Eastern Mediterranean countries



Discussion and conclusion

The overall DT varies a lot between different governorates/regions and among PHC facilities. It is considered as too short when compared to the WHO recommendation. Similar results of too short DT have been observed in other countries. Results extracted from studies reported by WHO/INRUD between 1990 and 2006, showed DT in developing and transitional countries was just over one minute. Therefore low average DT were problems all over the world. There are many variables which can influence the DT and in this study we had examined just some of the main ones from our point of view. The results revealed that the average DT is longer in rural areas probably due to

relatively low percent of educated people and less number of attendants in comparison with the urban. Also DT is longer in the facilities using paper prescriptions and in facilities where dispensing was carried out by nurses. Nurses may take longer time to read the prescription, prepare and pack the medications and write the label as they have relatively less knowledge and skill in dispensing. In general, the more the average OPD visits or average prescription dispensed or the more the average number of medicines per prescription the shorter the average DT. The DT was also short for some facilities where the patient turnover was slow and the dispenser has sufficient time for dispensing. Such a short DT found in this study is probably inadequate to interpret the prescription, prepare and pack the medicine/s and allow the possibility of proper information flow between patient and dispenser. Therefore, appropriate and workable solutions need to be developed and implemented in order to assure that the patients receive the right medicine, in appropriate form, in correct doses and quantities, and proper packing and accompanying advice.

References:

1. How to investigate drug use in health facilities: selected drug use indicators. Geneva, World Health Organization, 1993.
2. Hogerzeil HV, Ross-Degnan D, Lang RO, Ofori-Adjei D, Santoso B, Chowdhury AK et al. Lancet 1993; 342-10.
3. Otoom S, Batiha A, Hadidi H, Hassan M, and Al-Saudi K. Eastern Mediterranean Health Journal, 2002, 8(4,5)
4. Khatib R, Daoud MPH, Abu-Rmeileh NME, Mataria A, McCaig D. Pharmacoepidemiology and Drug Safety, 2008, 17(11), 1123-1130.
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For each group of 4 items below one member is the 'odd one out' as it does not fit with the other members of the group for a specific reason.

Select the 'odd one out' and give your reason (s)

1. Codeine/ Morphine/ Tramadol/ Ibuprofen
2. Roundworm/ Hookworm/ Ringworm/ Pinworm
3. Propranolol/ Labetalol/ Atenolol / Carvedilol
4. Hydroxychloroquine/ Proguanil/ Sulfadoxine-pyrimethamine/ Mefloquine
5. Fluconazole/ Ketoconazole/ Carbimazole/ Miconazole
6. Biceps/ Triceps/ Quadriceps/ Deltoid
7. Ceftriaxone/ Cefotaxime/ Cefepime/ Ceftazidime
8. CK/ AST/ ALT/ LDH
9. Nifedipine/ Amlodipine/ Carbamazepine/ Diltiazem
10. Olanzapine/ Risperidone/ Citalopram/ Chlorpromazine



Workshop for Medical Interns Held at College of Medicine SQU, July 2009



Answers:

1. *Ibuprofen* is NSAID while the rest are opioid analgesics; 2. *Ringworm* is a clinical term used for fungal infection of skin while the rest are parasites; 3. *Atenolol* is a selective beta-blockers while the rest are non-selective; 4. *Hydroxychloroquine* is predominantly a disease modifying anti-rheumatic drug (DMARD) rather than an antimalarial drugs; 5. *Carbimazole* is an antithyroid drug while the rest are antifungal drugs; 6. *Quadriceps* is a muscle in the lower limb while the rest are upper limbs muscles; 7. *Cefepime* is 4th generation cephalosporins while the rest are 3rd generation cephalosporins; 8. *ALT* is a liver function test while the rest are cardiac enzymes (e.g. raised in myocardial infarction); 9. *Carbamazepine* is an antiepileptic with many other uses within the CNS the others are calcium channel blockers; 10. *Citalopram* is a selective serotonin re-uptake inhibitor (SSRI) used as an antidepressant, the others are antipsychotics

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