Patients' Adherence
**Sudan Journal for Rational Use of Medicine (SJRUM)** is a quarterly publication produced by the National Medicine Information Center and Reference Library (NMICRL); Directorate General of Pharmacy; Federal Ministry of Health; Sudan. **SJRUM** is funded by Global Fund and technically supported by the World Health Organization. The first issue was published in September 2012. **SJRUM** aims to promote Rational Use of Medicines (RUM) through disseminating principles, views, news, and educating health providers about rational use of medicines. **SJRUM** targets health professionals; prescribers, pharmacists, and nurses. Each issue is centered on a theme; which usually is an important subject in RUM. **SJRUM** highlights in each issue the current situation in Sudan relevant to the theme, presented either by evidence from local research or with reliable anecdotal evidence. **SJRUM** includes research studies which aim to encourage young researchers to publish their work at national and international levels. **SJRUM** also includes a section for educational materials relevant to RUM relying mostly on the WHO educational materials and other reliable sources. The section of news reflects some important published news that may affect RUM practice. **SJRUM** includes some selected case studies, reflecting current practice at different health facilities in Sudan, so as to highlight the irrational aspects in order to overcome them. As part of NMICRL activities, medical students and the public are endowed with leaflets and fliers on selected topics of **SJRUM**. Readers have the freedom to use and reproduce any part of this journal. For participation please contact: sjrum@khmic.org For more information …You can access **SJRUM** online on www.sjrum.sd

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Dear fellows and readers

Welcome to the 9th issue of SJRUM.

On behalf of the team of editors, I would like to welcome you all our distinguished readers, and present to you the ninth issue of SJRUM about patients’ adherence.

Patients adherence to treatment describes the degree to which patient follows correctly the medical advice or prescribed regimen, whether it is pharmacological, exercise, dietary or physical therapeutic regimen. It is a major public health problem that has been reported with a very high rate in the literature. Patients’ adherence to treatment is a key mediator between the medical practice and the patients’ outcomes. Serious consequences may result from lack of adherence, like therapeutic failure, reduced patient’s quality of life, reduced patients’ life span and higher long-term health costs. Patients’ non adherence is a multidimensional situation involving many stakeholders who should have positive roles in a concerted effort to ensure the success of adherence improving strategic programs. Healthcare providers in our beloved country Sudan are looking forward to make the paradigm shift towards the patient centered approach, so all of us need to take substantial steps to fill the gap in our practice to satisfy the allocated role, to make this inevitable shift. For example for pharmacists, the clear message is to assess each patient individually to provide the targeted intervention responsive to the patient own unique risk factors and needs.

The current issue includes articles about patients non adherence; the situation in Sudan, teaching materials, relevant researches and case study reports about the topic, written by different authors and healthcare professionals, reflecting valuable experiences in their field of knowledge and expertise.

I take this opportunity as well to invite you once again to contribute your knowledge and experience to enrich our journal, as we also welcome your feedback on this issue and all other issues.

Randa AlSadig AlMahdi
Where are we from: Types of Medication Non-adherence

Non fulfillment
Prescription was never filled or initiated.

Non persistent
Patient stopped taking medication on his own.
Unintentional; usually arise from miscommunication or resource/capacity limitation or misunderstanding.

Non conforming
Patient stopped taking medication on his own.
Medication was not taken as prescribed.
Missed doses, incorrect doses, dose taken at wrong times.

Factors affecting medication adherence

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<th>Health care system factors</th>
<th>Therapy-related factors</th>
<th>Social and economic</th>
<th>Disease factors</th>
</tr>
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<td>Route of administration</td>
<td>Inability to go to work</td>
<td>Disease symptoms</td>
</tr>
<tr>
<td><strong>Psychosocial factors</strong>: beliefs, motivation, attitude, patient-</td>
<td>Long waiting time</td>
<td>Treatment complexity</td>
<td>Costs and income</td>
<td>Severity of the disease</td>
</tr>
<tr>
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<td>Difficulty in getting prescriptions filled</td>
<td>Duration of the treatment period</td>
<td>Social support</td>
<td>Information about disease</td>
</tr>
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<td><strong>Patient knowledge</strong></td>
<td>Unhappy clinic visit</td>
<td>Medication adverse effect</td>
<td></td>
<td>Disease symptoms Vs adverse effects</td>
</tr>
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<td><strong>Physical difficulties</strong></td>
<td></td>
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<td>Degree of behavioral change required</td>
<td></td>
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<td><strong>Tobacco smoking or alcohol intake</strong></td>
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<td>Unpalatable taste of medication</td>
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<td><strong>forgetfulness</strong></td>
<td></td>
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<td>Asymptomatic diseases</td>
<td></td>
</tr>
</tbody>
</table>

Reference

1. Planning and Policies Directorate, Directorate General of Pharmacy-Federal Ministry of Health
It is a very common knowledge that failure to take medicines, adversely affects the outcome of treatment, and places a huge burden of wasted resources on the society. Three seemingly related terms; compliance, adherence and concordance have been used to describe medication-taking behaviour in chronic illnesses. This evolution in the terminology is not merely a change in definitions but it tends to be a constructive development embraces the idea of a partnership between the patient and providers which is needed to address the patient’s needs better.

Compliance is defined as “the extent to which the patient’s behaviour matches the prescriber’s recommendations” 1. However, studies over the past few decades have questioned the validity of this term because it refers to a process where the clinician decides on a suitable treatment and the patient is expected to comply with unquestioningly, without given any consideration to the patients’ perspectives in taking their medications.

As a result the term adherence has been introduced as a replacement for compliance in an effort to place the clinician-patient relationship in its proper perspective; hence adherence refers to a process, in which the appropriate treatment is decided after a proper counselling with the patient. The term compliance also implies that the patient is under no compulsion to accept a particular treatment, and is not to be held solely responsible for the occurrence of non-adherence. Accordingly, adherence has been defined as “the extent to which a person’s behaviour, in taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider” 2.

Lately the concept of concordance has evolved from a narrower view, emphasizing an agreement between the clinician and the patient, which takes into account each other’s perspective on medication taking, to a broader process consisting of open discussions with the patient regarding medication-taking, imparting information and supporting patients on long-term medication. It is a process, which entertains patients’ views on medication taking, and acknowledges that patients’ views have to be respected even if they make choices, which appear to be in conflict with the clinician’s views.

Adherence to medications causes 125,000 deaths annually and accounts for 10% to 25% of hospital and nursing home admissions 3:

Pharmacists encounter similar patients in their daily practice, and many may struggle to find effective strategies to address non-adherence. Pharmacists are in a unique position to address non-adherence. Their drug expertise, along with their accessibility, makes them ideal candidates to address this significant problem. Peer-reviewed short stories similar to the three cases presented in this issue of SJRUM may address the misperceptions underlying non-adherence.

Although none of these terms are ideal solution to understand the complex process
of medication-taking behaviour of patients, the move from compliance to adherence and concordance represents genuine progress in this field, which puts the patient’s perceptions at the centre of the whole process.

A number of strategies have been suggested to improve adherence including: the simplification of regimen by adjusting timing, frequency and dosage to match patients’ activities; imparting knowledge by discussion with physician, nurse and pharmacists modifying patient’s beliefs, involving patients in decisions tailoring the education to patients’ level of understanding and evaluating adherence by self-reporting, bill counting ⁴.

Perhaps, the best therapeutic outcomes can be realized, at least in part, by tailoring the treatment to the patient’s lifestyle, not the other way around.

References
4. Atreja A, Bellam, Levy SR. Strategies to enhance patient adherence: making it simple

Mohammed Ali is an 11 years old boy who lives in a small rural community near Khartoum. He was diagnosed with tonic colonic seizures since the age of 8 when his family took him to a referral hospital in Khartoum. Since the age of 5 he started to fall down suddenly, lose consciousness, collapse, and then his body becomes stiff. His family and the local community there have a misconception about his illness as a supernatural phenomenon that can be treated by going to the local traditional healer (Sheikh) who thought it was a curse. The child continued experiencing these episodes and each time he was taken to the Sheikh who used to give him some blessings and herbs to drink.

Mohammed Ali did not go to school because of his illness, when he was 8 years old, He admitted to the hospital and he was diagnosed with epilepsy and prescribed a phenytoin 300 mg per day and regular visits for follow up were scheduled. The child was taking his medicine regularly supervised by the mother who has been told by the doctor and pharmacist how important the drug is to control his condition. His symptoms were brought under control, and he had very few seizures since then.

As Mohammed Ali grew older into his early adolescence, he started to refuse taking his medication, as he thought the drug caused him some bad effects’ like frequent pain and swelling of his gum. His adherence to treatment was lost gradually, he also refused to go for follow up visits to the hospital and he started to seize again frequently.

Problems

- Misconception and lack of correct information about epilepsy.
- Patient non adherence with prescription.
- No medical follow up for a long time.
- The child was not involved in his own disease and its treatment to become committed, and the responsibility was left for the mother alone.
- Lack of patient education about the disease has directly led to the non compliance.

Solutions

- Patient education should be highly considered and monitored to insure patient commitment to the treatment plan.
- Patient education should involve the patient to be committed to the treatment plan.
- Patient counseling on medication and the association between adherence to treatment and control of symptoms.

1. Lecturer of pharmacy practice, Faculty of Pharmacy, University of Sciences and Technology
Who is to Blame?

Nuha M. Agabna¹

Scenario

Farouq, is a 63 years old retired soldier who suffers from diabetes mellitus type II for ten years. He is covered by insurance and receives medical services from Military health units. He goes monthly for a visit, usually seen by house officers, and his prescriptions refilled. The specialist is seen only when there is a medical condition that implies to. His diabetes almost never controlled; he suffers hypoglycemia frequently, and his monthly check up shows high blood sugar. He eats what he likes, not compliant with his medicine, and generally thinks that death comes when it comes and taking care won’t delay it. He becomes confused over his medication frequently; he is confused with the different packages of medicines he gets. As result sometimes he misses doses, or takes them more than once from a different package. And other times medicines were not available at the pharmacies and might stay days without taking his medication.

Because of bad care for his foot he developed gangrene/ulcers on both feet. He was given appropriate medications and advised to dress the wound daily, along with the regular monthly specialist visit. Because the specialized diabetes care center was too far he went to a near health clinic for dressing. No improvement was seen over two months, and one leg actually got worse with spreading wound. His specialist decided to admit him for surgery and to switch to insulin to assist healing.

During his hospital stay his wife encountered a “Diabetes Patients Friends” group and one of the members came to visit her husband. The member offered counseling and some information about diabetes and the current patient’s condition. Both husband and wife were astonished because this is the first time they hear such a talk. They understood a lot of things and both felt that life would have been easier for both if they had knew this information before.

Problems

• Patient’s non adherence with medication and diet.
• Confusion over medication because of the different packages for the same medicine.
• Medicines unavailability.
• Difficulties accessing specialized health care.
• Lack of counseling and patient education.

Solutions

• Patient education and counseling is an important part of successful disease management. The process has to be repeated many times to ensure full understanding and hence compliance. Written information could be useful; they would be available for the patient as people generally don’t get all what is said.

• When switching brand pharmaceuticals; the pharmacist must explain to the patient/co-patient and ensure understanding.

1. Lecturer of pharmacology, Faculty of Dentistry, University of Khartoum
Oral Anticoagulants

Nissreen E. Mohamed

Excerpts from the text:

Mohamed Ahmed is 43 years old bus driver diagnosed with deep vein thrombosis on the left leg one month ago so oral anticoagulant; warfarin was prescribed for six months. Last week he was admitted to hospital with ischemic stork most probably because of an embolus from his thrombosed leg. Proper management was provided for him and stroke signs were improved. The appropriate dose of warfarin was given according to his international Normalized Ratio (INR) and aspirin. During counseling session the clinical pharmacist knew that Mohamed was told by his previous physician that warfarin may cause some troubles, and that was the reason he was not adhered to his medication. He completely stopped warfarin when his gum mildly bled. The clinical pharmacist explained to him that stopping the medication was the cause of the stroke. The proper information to use warfarin; adherence with the treatment, drug – drug and drug – food interactions and proper monitoring of INR, were given to Mohamed Ahmed.

Problems

- Misleading information was given to the patient instead of proper counseling at first time.
- The patient discontinued his treatment by himself.
- Failure of treatment due to non-adherence to medication.
- Information given to patients about their medications should be balanced to involve the importance and benefits from using medicines as well as serious side effects like bleeding.

Solution

- Patient counseling should be an essential part of therapeutic plan because improper counseling can lead to failure of therapy especially for medication such as warfarin which requires close monitoring.
- Medical staff should be trained to deliver proper counseling regarding important medicines like oral anticoagulants, using verbal and written materials.
- Patient education is an important element that leads to success of therapeutic plan.
- Deficiency of clinical pharmacy services might lead to serious health problem.

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1. Clinical pharmacist, Ahmed Gasim Cardiac Surgery and Renal Transplantation Center (AGCSRTC)
Adherence is Vital in Chronic Diseases

Sawsan E. Ahmed

Scenario

A 37 years old pregnant lady, of 167 cm height and 96 kg body weight, arrived to her regular antenatal care clinic. Upon measuring her blood pressure, it was 150/100 mm Hg, which was considered an elevated systolic and diastolic blood pressure, accordingly, diagnosis of hypertension was made. The patient had normal hepatic and renal functions. She stated that she has no history of elevated blood pressure, denied any history of chronic medication use except paracetamol per need. The patient has reported a remarkable recent weight gain over the past two years, attributing this to her sedentary life style and stressful workload because of her new job.

The treating physician prescribed to her oral methyl dopa tablets 250 mg twice daily and advised her to reduce her weight and to do some exercise. One month later, she came to the doctor for a scheduled follow-up visit, she had no change in her body weight, while her blood pressure reading has shown a reduction in systolic blood pressure and elevation in her diastolic blood pressure, the reading was 140/110 mmHg. The patient also admitted that she did not do any exercise, but she was taking her prescribed medication exactly as was prescribed. The doctor then contacted the pharmacy to cross check that the pharmacy dispensed this prescription on the same date, which was true, so he asked the patient to bring her medication bottle in her next visit to the clinic, fixed in two weeks time. When the patient brought her medication bottle, the doctor found some remaining tablets in the bottle, which must have been empty by this time, if the patient was compliant with her prescribed regimen. Moreover, the patient told the doctor that there are some tablets kept in a tissue paper in her cabinet as well. The doctor realized that his patient was not adherent with her medication order.

Problems

- The patient was not adherent with her prescribed drug regimen, or with the exercise and weight reduction as was advised by her treating doctor.
- The patient has kept some of her tablets outside their original container, with the potential of confusing them with other medications, if available.
- It was obvious that this patient has not been counseled about her medication and how important to adhere with the doctor's advises.

Solutions

- The diagnosis of hypertension should be made after three consistently high measurements of blood pressure.
- Doctors and pharmacists are required to do an effort to make sure that patients will adhere to their prescribed medication regimens as prescribed.
- Interventions that contribute to improve adherence like patient education and patient counseling are very important with special consideration to chronic diseases for newly diagnosed patients.

Non adherence with the prescribed treatment regimen is a real problem that results in treatment failure and consequently, increased morbidity and mortality.

1. Medicines’ Information Center pharmacist, Omdurman Maternity Hospital
Red Eye

Introduction
Common causes of red eye include:
• Conjunctivitis (viral, bacterial, allergic or chemical).
• Foreign body, conjunctival, corneal or subtarsal (under the upper eye lid).
• Corneal ulceration.
• Burns (acid, alkali or thermal).
• Blunt injury; by a blunt object may cause hyphema (blood in the anterior chamber).
• Penetrating injury (typically by a sharp object e.g. a stick cause corneal or scleral penetration).
• Lid laceration (in lid or canaliculus).
• Subconjunctival hemorrhage.
Other uncommon causes include iritis, scleritis, episcleritis and acute congestive glaucoma, which require referral.

Signs, Symptoms and History
Obtain a through history to identify if there is a possibility of ocular trauma, contact lens wear, the time and course of the redness and the presence of eye pain, itch and discharge.

Diagnostic signs: Patients may present with an array of symptoms depending on the etiology of the red eye. Patients who present with pain, photophobia and watery discharge may have a foreign body, a traumatic corneal ulcer, herpetic ulcer or acute glaucoma. Dull, aching eye pain is the main presentation with iritis, scleritis and episcleritis. Subconjunctival hemorrhage may be caused by trauma or it could also be caused by vigorous coughing or vomiting. Trauma to the eye can present with focal conjunctival injection or iris injury.

1. Conjunctivitis:
   1.1. Infective conjunctivitis: Caused by bacteria and results in a sticky discharge in both eyes with clear cornea, normal pupil and normal vision and red eyes. Infective conjunctivitis in the neonate usually occurs in the second day of birth due to eye exposure to bacteria during birth. It is a bacterial swelling of the eye and can lead to purulent discharge and eyelid swelling. (Chlamydia and gonorrhoea infections require urgent referral).
   • Viral conjunctivitis: watery discharge,
   red eyes and itch.
   • Allergic conjunctivitis: red eyes, excessive lacrimation and itch.
   1.2. Corneal ulcer: white spot or mark on the cornea which stains with fluroscein. The redness is most marked around the cornea, excessive watery discharge (lacrimation) + significant photo phobia. There are several causes for corneal ulcers most importantly vitamin A deficiency, malnutrition, longstanding conjunctivitis and herpes simplex and herpes zoster ophthalmicus.
   2. Iritis: The pupil is small and becomes irregular as it dilates. The redness is most marked around the cornea, watery discharge (lacrimation) + significant photo phobia. Patients should be referred to secondary care.
   3. Acute glaucoma: redness is generalized and the eye is very painful with poor vision, dilated pupil, raised intraocular pressure and shallow anterior chamber. The cornea is hazy due to fluids. Patients should be referred to secondary care.

Investigations
The eye should be examined carefully by inspecting the eyelids and their undersurface. A slit lamp should be used to examine the conjunctiva, pupil, iris and cornea.
If suspecting a corneal abrasion or ulcer, stain the eye using fluroscein before the examination.
If suspecting trauma, examine for enophthalmos, diplopia, subconjunctival hemorrhage, hyphema and retinal detachment. Visual acuity should always be measured in patients presenting with eye complaints using age appropriate-visual acuity chart.

Criteria for same day referral:
1. Moderate to severe eye pain or photophobia
2. Marked redness of the eye
3. Reduce visual acuity
4. Suspected penetrating eye injury
5. Irritant conjunctivitis
6. Neonatal conjunctivitis
7. Scleritis
(Patients with suspected raised intraocular pressure should be given intravenous acetazolamide and pilocarpine eye drops before urgent referral to secondary care)
Non Pharmacological Management
(See under separate conditions below)
Pharmacological Management
(See under separate conditions below)

1. **Eye Tear**
   - Do not place anything on the eye including eye ointment or eye drops.
   - Place a sterile dressing to cover the eye.
   - Give systemic antibiotics.
   - Refer the patient to the ophthalmologist for same day assessment.

2. **Allergic Conjunctivitis**
   - May be seasonal and occurs with other symptoms such as rhinorrhea and sneezing.
   - Administer antihistamine eye drops – ketotifen or sodium cromoglycate
   - Advise patient to avoid suspected allergens.
   - In severe symptoms, give steroid eye drops in addition to a mild steroid e.g. fluorometholone. If no improvement then gives dexamethasone eye drops with subsequent tapering in addition to a mast cells stabilizer e.g. sodium cromoglycate eye drops( 2% for children and 4% for adults)

3. **Infective Conjunctivitis (Adult)**
   - Infective conjunctivitis caused by bacteria.
   - Wash the eyes daily with clean water.
   - Administer tetracycline eye ointment every 8 hours for 7 days, or chloramphenicol.
   - Refer the patient to the specialist if no improvement in three days.

4. **Infective conjunctivitis (Neonate)**
   - Remove pus from the eye using sterile gauze every hour.
   - Administer tetracycline ointment three times daily.
   - Refer the infant to the hospital.

5. **Corneal Ulcer**
   - Administer tetracycline ointment to the eye every hour.
   - Administer systemic antibiotic e.g. Doxycycline 100mg capsules every 12 hours.
   - Administer vitamin A 100,000 I.U. for children
   - Refer the patient to ophthamologist urgently.
   - Eye Lesions

6. **Foreign Body**
   - Carefully remove the foreign body with a cotton swab if it is lying superficially in the eye. If the object is embedded, refer the patient for removal.
   - Administer tetracycline ointment once a night.
   - Refer the patient if no improvement occurs after 24 hours.

7. **Corneal scratch**
   - Administer tetracycline ointment once at night.
   - Close the eye with sterile dressing.
   - Refer the patient to the specialist if no improvement occurs after 3 days.

8. **Subconjunctival Hemorrhage**
   - Bed rest for 5 days
   - Refer if no improvement occurs after 3 days.

9. **Eyelid tears**
   - Check the eye carefully for other non-immediately apparent eyelid tears.
   - Close the eye with sterile dressing.
   - Administer systemic antibiotics e.g. Doxycycline 100mg capsules every 12 hours.
   - Refer to the specialist.

10. **Chemical and heat burns**
    - Wash the eye with copious amounts of sterile water.
    - Administer tetracycline ointment.
    - Refer urgently to the specialist.

**Follow-up**
Patients should be seen every 24 hours and referred if worsening of the symptoms occurs.

**Prevention**
Patients should be advised to keep foreign objects and chemicals away from the eye. In instances where an eye bandages has been place, not to remove it without the doctor’s advice.

Reference
Sudan National Standard Treatment Guidelines, Directorate General of Pharmacy, Federal Ministry of Health, Sudan, 2014
Patient with Diabetes Type 2: Assessing Compliance and Barriers to Adherence, Nyala City, South Darfur State, Sudan

Ahmed D. Ahmed¹, Asim A. Elnour², Mirghani A. Yousif ³

Introduction
In Sudan, there are few articles published about adherence to medications. The current need for assessing medications adherence provide good opportunity to implement interventional adherence related studies. In a cross-sectional study of patients with hypertension, factors associated with adherence, status of blood pressure (BP) control and occurrence of complications were assessed. Despite that the adherence rate was reasonable, 36.8% of patients were non-compliant because they could not afford to buy antihypertensive drugs. These patients experienced uncontrolled blood pressure (BP) and other complications ¹.

The aim of this study was to investigate the level of compliance and the associations between education level, occupation, income and age using the Brief Medication Questionnaire (BMQ) ².

Methods
This was a part of a multi-center descriptive study, including 10 public health clinics in Nyala South Darfur. The study employed 300 patients with type two diabetes, aged 18-79 years on oral hypoglycaemic drugs taking four or more other medicines (whether cardiovascular drugs or not). Demographics, medical information and laboratory results were collected beside the BMQ which assesses four barriers to adherence; namely regimen, beliefs, recall and access to medication. Data was analyzed statistically to determine significance.

Results and Discussion
Regarding regimen the screening indicated a non-adherence with current drug regimen, where a total score of five was obtained out of five. The screen was positive denoting non-adherence with diabetes and cardiovascular medications as indicated by the high score.

Screening for belief barrier indicated negative beliefs or motivational barriers regarding efficacy, adverse side effects and other concerns regarding a given drug and its effects, where the total score obtained was two.

The two questions: whether patient’s receive a multiple dose regimen (2 or more times/day) and/or report any difficulty remembering his/her medications, were used to detect recall barrier (total scores= 2.0). The population scored two confirmed the presence of recall barriers.

Results displayed difficulty paying for medication and difficulty getting refills in time indicating access barriers to compliance (total scores= 2.0) The results showed that access represented certain degree of hindrance to medication adherence.

To determine correlation between screen and demographic parameters, person correlation coefficient was used at final follows up. The findings revealed that education had a significant negative correlation with Regimen, Belief, Recall and access screens which were (-0.54, -0.11, -0.16 and -0.4) respectively. This indicated that patients with high education level had low screen scores, which entails that patient’s level of medication adherence was improved.

There was significant positive correlation between the occupation and Regimen, Belief, Recall, and Access screens with correlation coefficients (0.38, 0.16, 0.008 and 0.14); respectively. However; the association was not significant in Recall screen (P =0.154). This has also indicated that patient

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with occupation had low screen scores, which entails that patient's level of medication adherence was improved.

With respect to income, significant negative correlations was observed with Regimen and Belief screens, (-0.32 and -0.14); respectively. However; the association was not significant with the recall and access screens (P =0.961; 0.64) respectively.

When income increased the regimen and belief would have decreased, which means improvement of adherence.

Regarding patients' age there was significant correlation only with regimen screen, with a correlation coefficients of 0.13 (P =0.029). This means that older participants had low adherence.

The impact of poor adherence grows as the burden of chronic diseases grows too. The consequences of poor adherence to long-term therapies are poor health outcomes and increased health care costs, hence improving adherence enhances patients' safety. A correlation between the screen and demographic parameters is displayed in table 1.

<table>
<thead>
<tr>
<th>Patient socio-demographic parameter (Final assessment, stage 3)</th>
<th>Regimen</th>
<th>Belief</th>
<th>Recall</th>
<th>Access</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
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<tr>
<td>Pearson Correlation</td>
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<td>-0.11</td>
<td>-0.06</td>
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<tr>
<td>P value</td>
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<td>0.049*</td>
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<td>0.16</td>
<td>0.08</td>
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<td>0.32</td>
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<tr>
<td>P value</td>
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<td>0.007*</td>
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<td>-0.03</td>
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<td>0.014*</td>
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Key: *P<0.05.

Conclusion and Recommendations

A negative association was observed between educational level, income and occupation; while positive association was observed for age on various BMQ screen scores.

This finding dictates the importance of educating and training the patients to remove barriers to medications adherence.

References:
Introduction

Human immunodeficiency virus/ Acquired immunodeficiency syndrome (HIV/AIDS) is the fourth most common cause of death in the world. Globally, 34 million people were living with HIV at the end of 2011. Highly Active Antiretroviral Treatment (HAART) has dramatically reduced mortality and morbidity due to HIV infection.

Introduction of antiretroviral therapy has transferred the disease course from a fatal incurable into a chronic manageable infection. However, incomplete adherence to medication is the most contributing factor in treatment failure and the development of resistance.

Adherence to antiretroviral therapy was defined as to take 95% of the prescribed Anti-retroviral (ARV) drugs correctly in the right dose, frequency and time. Even though, an adherence level of 70-90% to ART drugs is found to be acceptable and effective. Factors that lead to non-adherence fell into three categories; those related to patients (e.g. educational level and psychological status), related to the patient’s interaction with healthcare provider and others related to clinical factors (e.g. pill's burden, dose frequency of the prescribed regimen and the drugs adverse reactions).

The objectives of this study were to examine the level of adherence of patients to their therapy and to explore factors associated with patients' non-adherence among HIV/AIDS patients receiving ART drugs.

Methods

This is a cross sectional clinical center based survey done on 310 adults HIV positive patients in ages of more than 16 years old who are taking HAART drugs for at least 6 months prior to the survey, who are registered in Omdurman teaching hospital Sudan National AIDS Program (SNAP) center. Omdurman center is the largest one receiving patients residing both inside and outside Khartoum city.

The data were collected using interviews and questionnaire forms, from two sources; key informants (were the healthcare workers) and patients' medical records to fill the predetermined study variables.

The study variables were grouped into demographics, sociocultural, socioeconomical variables, and treatment related variables. Other factors such as; quality of care, confidentiality of information, educational services and counseling on using drugs were also taken into consideration.

Results and Discussion

The respondents were 191 males and 119 females. Among the total number of the respondents (70%) have started ART treatment regimens at stage 3 of disease, with time elapsed since diagnosis ranged from 6 months to two years. Subjects adherent

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to treatment were 66.1%, while 33.9% were not. Among males the adherents were 71.7% compared to 57.1% among females (p= 0.008). Other factors found to influence adherence level beside gender, were marital status; married were 70.7%, divorced were 53.8%, singles were 67.3% adherent and 50% widowed (p= 0.051). Research findings have emphasized the importance of social support in the treatment of HIV patients, family, community members and peers in improving ART adherence.

The educational level was found to slightly affect adherence, those who were at primary education were 55.7%, 77.4% at secondary school level, 80.5% were university graduates (p= 0.001). Employment was another factor that influence adherence, 70.6% of the occupied were adherent versus 29.4% non-adherent. Among those who were unemployed; 48.1% were adherent, while 51.9% were non adherent (p=0.002).

A significant negative association as well existed between travelling time to the center and increased costs of treatment with adherence, (p =0.005).

In-spite of the negative association, patients still prefer to receive their healthcare services from SNAP centers that are far located from their residences because of the stigma and social fears.

Other factors that have positively affected patients’ adherence to treatment were; knowledge about ART and counseling (p=0.002). Further questioning patients about reasons for non-adherence has shown that: forgetfulness (48%), drugs out of stock (32%), appearance of troublesome side effects (7.6%), and too many pills (3.4%).

By checking patients' medical records, reports have shown that 53% didn’t miss any dose, 18% missed one dose, 14.8% missed two doses, and 10.6% missed three doses while just 3.2 % have. However, these reports were in contradiction with the direct responses from patients which have revealed patients' adherence level lower than that reported in their medical records.

**Conclusion**

This survey has pointed clearly a number of factors that have influenced the level of patients' adherence to treatment; among which age, gender, and level of education, travelling time, travelling cost, marital status, employment, stigma and good counseling about drugs. The study has finally recommended newer policies to be introduced in the overall care plan for best management of HIV/ AIDS patients.

**References**


WHO says it is ethical to use experimental drug ZMapp in management of EBOLA

WHO, August 2014

The WHO has recently issued a statement to allow the use of the experimental drug ZMapp in the management of Ebola infection.

The recent outbreak of Ebola infection is the largest to date and has claimed the lives of more than 1000 patients since it began in the West African country; Guinea in March 2014.

It is highly contagious and spread within humans through contact with bodily excretions from infected individuals who show symptoms. The disease starts with non-specific symptoms such as fever, myalgia and a sore throat but progresses rapidly to cause a haemorrhagic fever with a fatality rate of 90%.

There is currently no known cure or vaccine for Ebola but an experimental drug that consists of a cocktail of antibodies has been recently used to successfully treat two American aid workers who were evacuated to the USA after being infected with the virus while treating patients in West Africa.

The drug has been used so far in monkeys with good results but there are no studies in humans in terms of efficacy and safety. In view of the recent outbreak, the WHO convened a panel of Medical ethicists to discuss the possibility of using an experimental drug known as ZMapp for the treatment of Ebola patients. The experts issued a statement stating that under the current circumstances, it may be considered ethical to use this drug in Ebola infected patient and urged health care workers using the drug to report patient outcomes in order to share the results within the medical community.

Clarithromycin associated with increased risk of cardiac events.
Schembri et al, BMJ, 2014

A study conducted in Scotland has shown an increased association between the use of clarithromycin and cardiac events. The researchers compared the outcomes of two groups of patients admitted with community acquired pneumonia and chronic obstructive pulmonary disease into NHS hospitals in Scotland. Cardiovascular events were defined as hospital admissions with acute coronary syndrome, decompensated cardiac failure, serious arrhythmia, or sudden cardiac death within one year of discharge from hospital.

A significant association was found between clarithromycin use and cardiovascular events and mortality. Longer durations of clarithromycin use were associated with more cardiovascular events. While the use of β-lactam antibiotics or doxycycline was not associated with increased cardiovascular events in patients with acute exacerbations of chronic obstructive pulmonary disease, suggesting an effect that is specific to clarithromycin.

This study highlights the fact that clarithromycin and other antibiotics should only be used when absolutely necessary to reduce risks associated with such severe side effects.

Global antibiotics consumption
Van Boeckel et al, The Lancet Infectious Diseases, August 2014

A study published in the Lancet infectious Diseases has shown an increase of 36% in the consumption of antibiotics between the years 2000 and 2010. The study analysed data from hospital and retail pharmacies in 71 countries from across the globe. Brazil, Russia, India, China, and South Africa accounted for 76% of this increase. The most alarming finding was the increase in the use of last resort drugs such as carbapenems (increased by 45%) and polymixins (increased by 13%).

1. Head of clinical pharmacy services, Radiation and Isotope Centre Khartoum
Background
Sudan Medical Council (SMC) is dedicated to the promotion of excellence in health care delivery, medical education, and research. It recognizes its responsibility to promote lifelong learning through the provision of educational experiences for all doctors (medical doctors, dentists, and pharmacists) and allied healthcare professionals. A wide range of learning opportunities for doctors via accredited Continuing Medical Education (CME) and Continuing Professional Development (CPD) activities had been recognized.

Development of the Specialist Register
Based on this report, SMC passed bylaws for Specialist Registration, and a Specialist Register was established in 1986. This Register, however, recognized one level of specialist with no differentiation on levels or types of specialization.

Documentation of CPD/CME activities
The ladder of progression in the doctors’ advancement pathway starts with specialist, goes up to senior specialist and ends with consultant. To move from specialist to senior specialist a doctor must attain 600 credit points in three years, and from senior specialist to consultant must attain 1000 credit points in 5 years. This is why all doctors registered in SMC are required to maintain a record of their participation in the Doctors Advancement Programme activities in a portfolio (Logbook). This portfolio will enable them to keep all the documentation related to the CME/CPD activities in which they engage in their active life.

SMC renamed the Continuing Medical Education Committee to “Doctors Advancement Committee” and gave it the mandate to finalize, fine-tune and implement the doctors’ advancement programme.

Advantages and impact of the Doctors’ Advancement Programme
In addition to placing medical doctors, dentists and pharmacist in their rightful career positions, The Programme is structured so that health care professionals are appropriately trained to be competent to deal with the health challenges of the 21st century. This should reflect directly and immediately on the quality of health care services that are delivered to patients.

The programme provides Uniformed Forces, Universities, and even private practice corporations with yardstick or template on which they can equate the ranks of the medical professionals in their roster. When moving across borders, the system hopefully equates or compares to current international systems.

To carry out its duties efficiently, the Programme first recognizes the centres in which the training activities are carried out and accredits them as authorized providers.

Accreditation of CME/CPD activities
Before submitting an activity for accreditation, the activity providers need to make sure that the activity aim at maintaining professional competence, not just scoring points for their own sake.

Postscript
The Program has been announced through all official channels. The cutoff date, however, in which candidates are exempted if they satisfy the years limit, is April 2012. This implies that all young specialist and senior specialists should apply for this Programme and register as soon as possible.

References
Accuhaler is a dry-powder inhaler (DPI) available in an easy-to-use format. It is breath activated; this means when inhaled, the accuhaler automatically releases the medication. When used properly, the accuhaler can deliver medication deep into the lungs to control symptoms of asthma.

Patients to use such type of medication should be selected carefully and informed about the differences between DPI and Metered Dose Inhalers (MDI). The following steps should be clearly explained to the patient. Make sure that patients are able to demonstrate the following steps properly before leaving the pharmacy or clinic. Check performance on the next visit.

1. Holding your Accuhaler in one hand, place the thumb of your other hand on the thumb grip.
2. Open your Accuhaler by pushing the thumb grip right around until it clicks, the mouthpiece should now be fully visible (You’ll also see the lever).
3. Hold the mouthpiece towards you and push the lever away from you until it stops.
4. Breathe out as much as possible.
5. Place mouthpiece between teeth without biting and close lips to form a good seal.
6. Breathe in steadily through your Accuhaler (not through your nose).
7. Remove your Accuhaler and hold your breath for about 10 seconds.
8. Breathe out slowly.
9. Rinse your mouth with water after using your Accuhaler and spit it.
10. Close your Accuhaler by sliding the thumb grip back to the original position, this makes your Accuhaler ready to use again for the next time.

Note:
The dose counter on the top of the Accuhaler shows how many doses are left to use.

**Advice on how to clean the Accuhaler device**

1. Mouthpiece should be cleaned by a dry tissue or cloth, two or three times a week or as needed, and **NEVER** be washed. If it gets wet, it will not work properly.
2. If powder sticks in the hole, it should be brushed out.
Q. What is meant by Adherence to (or compliance with) a medication regimen?
A. Adherence to (or compliance with) a medication regimen is generally defined as the extent to which patients take medications as prescribed/advised by their physician/pharmacist. The word “adherence” is PREFERRED by many physicians/pharmacists, because “compliance” suggests that the patient is not positively involved in his own therapeutic plan.

Q. Why patient adherence to a medication regimen is important?
A. Because the full benefit of the medications will only be achieved if patients follow the prescribed treatment regimens carefully.

Q. What are the major complications related to poor patient adherence?
A. Poor adherence to medication regimens contributes to increased morbidity, worsening of disease, mortality, and increased health care costs.

Q. How adherence rate is estimated?
A. Rates of adherence for individual patients are usually reported as the percentage of the prescribed doses of the medication actually taken by the patient over a specified period.

Q. What are the major predictors that increase potential for patients’ poor adherence to medications?
A. Patients may be non-compliant with their prescribed regimen, when they have; asymptomatic disease (e.g. hypertension), reduced cognitive abilities (forgetfulness), annoying medications’ adverse-effects, patient lack on believe of benefits of treatment, psychological problems, complexity of treatment, inadequate follow-up or discharge planning, or cost of medication.

Q. What are the system's barriers to patients’ adherence to treatment?
A. Those related to healthcare system; poor health care system, incompetent staff, or high medication cost.
Barriers related to health care providers; low level of job satisfaction and their interaction with the health care systems e.g. poor knowledge about drug cost and insurance coverage of drugs.

Q. How can we improve patients’ adherence to their treatment regimens?
A. Methods to improve adherence must involve combinations of behavioral interventions;
• Reinforcing and increasing convenience of care.
• Providing education to patients about health conditions and importance of treatments.
Methods can be grouped into four general categories:
• Patient education involving patients families.
• Improving dosing schedules.
• Extending clinics working hours to reduce waiting time.
• Improving communication between physicians and patients.

Q. What is the role of practitioners in enhancing patient non adherence?
Practitioners are required to pay more attention to detect poor adherence, informing patients about importance of treatment, simplifying prescribed regimens as much as possible and customizing the regimen to the patients’ lifestyle.
A simple strategy is to ask patients how they take their medications to identify poor adherence, if any. Poor adherent patients may need more intensive strategies to improve their compliance with treatment schedule by adopting one of the innovative measures for managing chronic diseases.

1. Medicines’ Information Center pharmacist, Omdurman Maternity Hospital
Since 2007 a group of pharmacist in South Darfur State tried to establish Medicines Information Center (MIC) in Nyala city. They held number of meetings with the general manager of Nyala Teaching Hospital at that time.

In October 2012, a workshop entitled: Rational Use of Medicines was held at South Darfur State in Nyala City, by the lecturers (Prof. Abdalla Elkhawad, Prof Elrasheid Ahmed, Dr. Kamal Alomda). The main workshop recommendation was the establishment of the first MIC on the state level, under the General Directorate of Pharmacy- South Darfur State. In 2012 pharmacist union in South Darfur State at Nyala city set one of the most important goals of the union as the establishment of the MIC. This meeting was organized by the General State Minister of Health, the General Manager of Nyala Teaching Hospital and General Director of Pharmacy with the result of establishment of the MIC in emergency department of Nyala Teaching Hospital. The General Directory of Pharmacy provides the center with two desktop computer, printer and two pharmacists were sent to be attached for a month in the National Medicines Information Center and Reference Library (NMICRL).

Presently the MIC is an integral part of the Pharmacy Department and responds to requests from all hospital staff but most commonly receive questions from physicians, pharmacists, pharmacy technicians, nurses and public. MIC provides drugs information and educational materials.

Asia M. Zareiba, Ahmed D. Ahmed

1. Medicine supply fund , South Darfur Ministry of Health , South Darfur State
2. Revolving Drug Fund (RDF), Ministry of Health, Nyala, South Darfur State
Pharmacists in charge are trained in information retrieval and analysis and use a range of information sources including specialist texts, information databases, references and primary journals. Public education has been demonstrated through the local media (radio and TV) which was covering the opening ceremony of the center.

On the 2\textsuperscript{nd} of November 2014 the center commenced its activities as the first center in the region by providing services to the public.

The center now broadcast a series of radio programs for the local public on weekly bases. As part of the centers activities a workshop was conducted on the rational use of medicines in Nyala University on February this year.

**Acknowledgements**

The center staff wishes to thank all medical agencies and community pharmacies in Nyala, south Darfur state; for their great support.
Patient Medication Adherence

Nuha M. Agabna

Definitions
Adherence has been defined as the active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behavior to produce a therapeutic result. It denotes choice and mutuality in goal setting, treatment planning, and implementation of the regimen.

Compliance is "the extent to which a person's behavior coincides with medical advice". Noncompliance then essentially means that patients disobey the advice of their health care providers. The concept of noncompliance not only assumes a negative attitude toward patients, but also places patients in a passive, unequal role in relationship to their care providers.

Concordance is "an agreement reached after negotiation between a patient and a health care professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken ". Recently the focus of concordance has shifted to mean similarity between doctor and patient in gender, race, and language.

Causes of non-adherence
The World Health Organization proposes that adherence is affected by the following factors (Figure 1):

- Health care system or provider-patient relationship factors.
- Disease and treatment factors.
- Patient related factors.
- Socio-economic factors.

Health care system or provider-patient relationship factor:
The quality of the patient-doctor relationship in a well organized healthcare system is a very important determinant of regimen adherence. Research has demonstrated that patients who are satisfied with their relationship with their health care providers have better adherence. Social support provided by nurses has been shown to promote adherence.

Figure 1: Causes of non-adherence

1. Lecturer of pharmacology, Faculty of Dentistry, University of Khartoum
Disease and treatment related factors:
Research has generally shown that lower regimen adherence can be expected in cases when a health condition is chronic, when the course of symptoms varies or when symptoms are not apparent, when a regimen is more complex, and when a treatment regimen requires lifestyle changes.

Patient related factors:
Patient noncompliance is attributed to personal qualities of the patients, such as forgetfulness, lack of will power or motivation, or low level of education. Higher levels of stress and mal-adaptive coping have been associated with more adherence problems. Psychological problems such as anxiety, depression, and fear of gastrointestinal adverse effects have also been linked with worse disease management.

The socioeconomic factors which thought to influence compliance are identified as:
• un-affordability and un-availability of medications.
• Shortage of health insurance coverage.
• Greater levels of social support, particularly disease-related support from spouses and other family members are associated with better regimen adherence. Studies have shown that low levels of family conflict, high levels of cohesion and organization and good communication patterns are associated with better regimen adherence.
• Health beliefs, misconception and attitudes: Appropriate health beliefs, such as perceived seriousness of disease, vulnerability to complications, and the efficacy of treatment, can predict better adherence. Generally patients adhere well when the treatment regimen makes sense to them, when it seems effective.

Interventions
The compliance interventions were classified by theoretical focus into education, behavior, and affective categories within which specific intervention strategies were further distinguished. No single strategy or programmatic focus showed any clear advantage compared with another. Comprehensive interventions combining cognitive, behavioral, and affective components were more effective than single-focus interventions.

Effective behavioral interventions:
Several specific strategies can help patients with behavior change.
• First is the establishment of rapport, conveying genuine interest in patients.
• Building the patient confidence in healthcare system.
• Good communication is a critical part of the behavior-change process. However, knowledge will not guarantee that behavior change will occur.

Finally, effective behavioral consultation with providers encourages patients to express their concerns and use active listening techniques, such as open-ended questions, clarifications, reflective statements, and summary statements.

References
Aronson. Time to abandon the term ‘patient concordance. British journal of clinical pharmacology. 2007, 64(5) 711-713.


Roter et al., Effectiveness of Interventions to Improve Patient Compliance: A Meta-Analysis Medical Care. 1998, 36(8) 1138-1161.


Strategies to Improve Patient Medication Adherence

Sarah A. Kareem

Half of the patients with chronic diseases were found by the World Health Organization to be non-adherent with their prescribed medications' regimens in the developed world, while those in the developing world were far worse than this percentage. A large number of patients don’t follow the treatment recommendations given to them. Solving non-adherence problem requires making patients more proactive in their own health care and forming closer interpersonal relationships with patients.

Don’t forget:

► Patients need to be supported, not blamed.
► The consequences of poor adherence to long-term therapies are poor health outcomes and increased health care costs.
► Improving adherence also enhances patient safety.
► Adherence is an important modifier of health system effectiveness.
► Improving adherence might be the best investment for tackling chronic conditions effectively.

Health care providers can help their patients follow prescribed treatments and achieve better treatment outcomes - particularly in chronic disease management - by working through three components model: the Information-Motivation-Strategy (IMS) Model. This model was developed after synthesizing findings from more than 100 large-scale studies and meta-analyses conducted between 1948 and 2009. Researches have shown that using multimodal interventions is more promising and have improved both adherence and treatment outcomes.

The IMS model demonstrates that information is a prerequisite for changing behavior, but in itself is insufficient to achieve this change. Motivation is also a critical determinant and is independent of behavior change. Information and motivation work better when combined with strategy to affect behavior; especially when the strategy used is familiar or uncomplicated (Figure 1).

The IMS model can be modified to fit in the health care setting of Sudan, illustrating the three model components with the appropriate recommendations for healthcare providers to apply them on their patients.

1. **Information**: All patients must well understand the provided health information they receive.

   - **Recommendations**: Communicate information effectively to patients. Build trust and encourage patients to participate in decision-making and to be partners in their own health care. Ask patients to share why and how they will carry out their treatment recommendations. Listen to patients' concerns and give them full attention.

2. **Motivation**: Making people believe in their treatment, motivate them to follow the treatment recommendations.

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1. Head of Medicines’ Information Center and Reference Library, Directorate General of Pharmacy, Federal Ministry of Health
• **Recommendations:** Help patients to believe in the efficacy of the treatment. Elicit, listen to and discuss any negative attitudes toward treatment. Determine the role of the patient's social system in supporting or contradicting elements of the regimen. Help the patients commit to adherence and to believe that they are capable of doing it. Be aware of and sensitive to patient's cultural beliefs and practices, and view treatment through a cultural lens to make sure that recommendations do not conflict with cultural norms.

3. **Strategy:** Concrete barriers represent a common set of obstacles to adherence, such as the cost of medications, unreliable transportation to make appointments, mental health issues, complicated storage requirements and complex treatment regimens. Patients need a practical strategy to follow treatment recommendations.

• **Recommendations:** Help overcome practical barriers that make it difficult for patients to effectively carry out a course of action. Identify individuals who can provide concrete assistance. Identify resources to provide financial aid or discounts. Provide written instructions/reminders. Offer links to support groups.

The IMS Model emphasizes the importance of patient-practitioner relationships through informing, motivating patients and focusing on the determined strategies intending to eliminate barriers to adherence with the prescribed treatment. It also is a useful tool for targeting patient needs, to individualize patient adherence and ultimately optimize health outcomes.

References


To help health care providers become more familiar with proven interventions that can enhance patient adherence, the following mnemonic "SIMPLE" could be used.

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Specific Interventions</th>
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| Simplifying regimen characteristics | Adjustment of time, frequency, amount, and dosage  
Match therapy to patients’ daily activities  
Using adherence aids, such as medication boxes and alarms |
| Imparting knowledge      | Discussion with physician, nurse, or pharmacist.  
Distribution of written information or pamphlets  
Access to health-education information on the Web |
| Modifying patient beliefs | Assessment of perceived susceptibility, severity, benefit, and barriers.  
Rewarding, tailoring, and contingency contracting |
| Patient and family communication | Active listening and provision of clear, direct messages  
Involvement of patients in decisions about their own treatments  
Sending reminders via mail, email, or telephone  
Convenience of care, scheduled appointment  
Home visits, family support, counseling |
| Leaving the bias          | Tailor of patient education to the level of understanding |
| Evaluating adherence      | Self-reports (most commonly used)  
Pill counting, measuring serum or urine drug levels |

1. Simplifying regimen characteristics.  
2. Imparting knowledge.  
4. Patient communication.  
5. Leaving the bias.  

1. Lecturer of pharmacology, Faculty of Dentistry, University of Khartoum
1. Simplifying regimen:
Many of the strategies used to simplify a regimen have already become well-standardized practices.
- Prescribe medicines that can be taken once a day. This can be done with a longer acting drug (wherever possible) or combined medicines.
- Match administration to the patient's daily activities. For example, before a meal or before going to sleep.
- Use adherence aids e.g. medication boxes, alarms.

2. Imparting Appropriate Knowledge:
Patients' understanding about their conditions and treatments is positively related to adherence. Adherence, satisfaction, recall, and understanding are all related to the amount and type of information given. Patients do not always understand prescription instructions and often forget considerable portions of what healthcare practitioners tell them. Effective information giving could be done by:
- Limiting instructions to 3 or 4 major points during each discussion.
- Using simple, everyday language, (only 36% of patients correctly interpret the meaning of "every 6 hours" Correctly)
- Strengthening oral education with written materials.
- Involving the patient's family members and friends.
- Reinforcing the concepts discussed.

3. Modifying Beliefs and Human Behavior:
For interventions that are complex and require lifestyle modifications it is worthwhile to address patients' beliefs, intentions, and self-efficacy to optimize changes in behavior and beliefs.

4. Patient Communication:
Communication encompasses interventions ranging from physician-patient communication, sending mail or telephone reminders, to involve patients' families in the dialogue. Listen to patients. Ask the patient about his/ her feelings, concerns and views about psychological factors on the adherence, then provide them with information about all areas that the individual finds pertinent, and encourage them to participate in decision making when a plan for management is formulated.

5. Leaving the Bias:
No clear relationship between adherence and race, sex, educational experience, intelligence, marital status, occupational status, income, and ethnic or cultural background. Moreover, an individual's level of adherence may vary over time and between different aspects of treatment proves that demographic factors play a minor role in adherence behavior. Adherence can be effectively enhanced by tailoring the education to the patient's level of understanding.

6. Evaluating Adherence:
This can be done by self-reports, pill counting, and in some cases measuring serum or urine drug levels. Of these, self-report is the most simple, practical and widely used tool. If a healthcare professional is unable to detect non adherence, it is impossible for him or her to correct the problem.

Reference
To use their prescribed and/or over-the-counter (O.T.C) medications safely and appropriately, patients need accurate, comprehensive, balanced, clear, easily understandable and practically useful medication information. Medication information has to be considered as an integral part of the health care. Patients usually get their needed medication information, from their health care providers, in verbal, written and/or visual forms. Failure to understand medication information, may lead to poor patients' adherence and medication errors, which may increase the risks to patients, and be quite costly to the individual patients and the community at large.

The verbal medication information which patients get from their health care providers, mainly the physicians and pharmacists, is mostly deficient, suboptimal, inadequate, difficult to understand, and is also easily forgotten. To be able to adhere to their medications, patients need to understand and recall that information and be satisfied with it. High patients’ general illiteracy, and low health literacy, as it is the case in developing countries, considered among many other factors, as the most frequent causes for poor patients’ understanding of medication information and its highly possible ensuing risks.

The difficulty of understanding the verbal medication information provided to patients by their health care providers, is also attributed to the very short duration of the encounter with health care providers, language barriers, type of message, number of medicines prescribed, psychological status of patient, age, anxiety, and medical and pharmaceutical technical terms (jargon) used, and the communication skills of the provider 1.

According to the Sudanese Council of Ministers 2004, Sudan have a high general illiteracy rate (50%) 2, also Sudan is distinguished by its multi ethnic society. Moreover, small percent of registered medicines are locally produced, and the casting majority of the officially registered medications are imported (88.8%) 3. English are used in the texts of written medication information, mainly the package inserts, more than Arabic which is the official native language. This assumption is further backed by the fact that the Sudanese National Medicines and Poisons Board (NMPB), which currently regulates the registration of pharmaceutical products, mandates in its article 13.2, that "The package insert should be at least written in English and or / Arabic languages". This statement, in itself, makes it very difficult, even for literate Sudanese individuals, to read and comprehend those texts. Moreover, many studies reported that there is quite considerable irrational prescribing, in Sudan, which might lead to medication errors.

Accordingly, it becomes imperative to use the visual medication information form, as represented by pharmaceutical pictograms, side by side to the verbal and written medication information forms, to complement and reinforce both of them, but not to replace them; in an attempt to secure better understanding of patients for their medications’ use instructions, to help them handle their medications more properly; thus increasing their safety, effectiveness and usefulness. Pictograms are intended to act as stimulus to recall information and keep it for future reference.

The International Pharmaceutical Federation (FIP) suggested various formats of the medication instructions to be printed in pictograms format.

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2. Head of Medicines’ Information Center and Reference Library, Directorate General of Pharmacy, Federal Ministry of Health
Sudanese people have a long history of familiarity with pictograms; since ancient, Meroe use of hieroglyphic symbols and the recent of pictographic symbols since the first elections 1953. Moreover, even the illiterate car drivers are smoothly dealing with the various traffic signals. This may help public to accept the pharmaceutical pictograms, which may prove more conducive to improve their understanding and use of medications’ information. Below are some examples of the pictograms used in the study.

References
Pharmacovigilance have partners at different levels; international, national or state level and pharmacovigilance sentinel sites at the bottom of the organizational network. Involvement of pharmacovigilance partners is crucial for the success of its activities. Partners share responsibility for the practice of drug safety monitoring; anticipate, understand and respond to the continually increasing demands and expectations of the public health administrators, policy officials, politicians and health professionals. These partners include; the Uppsala monitoring center at the international level, national pharmacovigilance center, and the advisory committee at the national level, hospitals and the academia, the pharmaceutical industry, healthcare professionals and the patients at the sentinel sites.

- Pharmacovigilance advisory committee is a multidisciplinary panel of clinical experts who determine the validity and clinical importance of the generated signals. Members should be capable of technical assistance in causality assessment, risk management, case investigation and crisis management.
- Pharmaceutical industry: The primary responsibility is to support post-approval surveillance activities for the safety of medicines.
- Hospitals: Pharmacy departments in hospitals around the world, have important efforts in clinical pharmacology and reporting of adverse drug reactions.
- Academia: Expansion of scientific knowledge in drug safety is attributable to greater awareness and academic interest in this field.
- Healthcare Professionals: Doctors, pharmacists and nurses who have been the major providers of case reports on suspected ADRs.
- Patients: Observations and reports made by a health professional will be an interpretation of a description originally provided by the patient.
- Other partners include; Federal and states ministries of health in Sudan, Sudan central medical supplies, Sudan medical council, drug importing companies, the public health institute PHI, the society of the Sudanese clinical pharmacists, medical societies, private clinics and community pharmacies.
The emergences of new mechanisms of antibiotic resistance continue to evolve for the last seven decades and whenever a new antimicrobial is introduced, microorganisms develop new mechanisms to evade its action. The explosion of antibiotic usage worldwide was always followed by the appearance of clinical infection with organisms resistant to commonly used antibiotics. This has led to a vast and widening chasm dividing the number of antibiotic resistant infections and effective drugs to treat them. This article deals with the different modes of antimicrobial resistance and the problems of therapy, focusing on the situation in Sudan.

Modes of antibiotic resistance are different, a whole bacterial species may be naturally or intrinsically resistant to an antibiotic for example Pseudomonas aeruginosa is invariably resistant to erythromycin. A microbe will be naturally resistant to an antibiotic if either it does not possess a target for its action or its outer structure is impermeable to the drug. However, naturally susceptible microorganisms can acquire resistance to a variety of antibiotics by selection of resistant mutants. In this situation the antibiotic suppresses susceptible bacteria and allows resistant mutants and others naturally insensitive to the antibiotic to overgrow and replace the susceptible bacterial population. The other mechanism is resistance transfer where bacteria acquire extrachromosomal DNA segment (plasmid, episome etc.), that contains resistance genes to several antibiotics. This DNA segment is transferable between bacteria; also known as infectious drug resistance. Under antibiotic pressure bacteria that possess resistance genes may transfer them...
to other bacteria. Resistance is expressed as inactivation of the antibiotic by inactivating enzymes, reduced permeability of the antibiotic into the cell; alteration of the binding site, efflux of the antibiotic or the microorganisms uses an alternative pathway in metabolizing the substrate.

The selection of drug resistant organisms and the unwanted development of colonization or infection with multi-resistant organisms is known as collateral damage, which is a term used to refer to ecological adverse effects of antibiotic therapy. Third generation cephalosporin as well as quinolone use has been linked to subsequent infection with multi-resistant Gram negative bacteria, methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant enterococci (VRE). Therefore, neither third generation cephalosporins nor quinolones appear suitable for sustained use in hospitals as routine antibiotic therapy.

Microorganisms are several steps ahead of us. We must value and conserve whatever antibiotics we have and should use them wisely and judiciously.

In our hospitals settings, the main cause for the rising antibiotic resistance is that antibiotics that cause collateral damage are routinely used for treatment of common infections, while standard, more effective and safe antibiotics are excluded. This will undoubtedly lead to treatment failure and increase patients morbidity and mortality, infection with multi-resistant organisms is known as collateral damage, which is a term used to refer to ecological adverse effects of antibiotic therapy. Third generation cephalosporin as well as quinolone use has been linked to subsequent infection with multi-resistant Gram negative bacteria, methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant enterococci (VRE). Therefore, neither third generation cephalosporins nor fluoroquinolones appear suitable for sustained use in hospitals as routine antibiotic therapy.

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References

Scope of the journal:
Rational use of medicines (RUM) issues directed to health care providers and medical students.

Suitability of publication:
All topics related to the different aspects of RUM will be evaluated by the editorial board. Prospective authors with a subject(s) or questions about the suitability of their papers or materials are invited to request an opinion from the Editorial Board. (sjrum@khmic.org).

Avoid plagiarism

How to submit materials:
Manuscripts can be handed over directly to the Directorate General of Pharmacy as soft copy or by e-mail (sjrum@khmic.org).

Types of manuscripts:
1. Research papers.
2. Case reports.
3. Thematic topics.
4. Success stories.

Preparation of manuscripts
All manuscripts must be typed in Arial font size 12, with 1.5 line spacing. Manuscripts must be in Word. Page margins on all sides must be at least 2.5 cm wide. You can use either English or American spelling but not both on the same manuscript.

1. Research papers
Original research will have the priority of publications. Author(s) name and affiliations should be clearly written. Contact person, telephone number and e-mail address should be included.
Total words count should not exceed 800 words including references, tables, table captions, figure legends, and footnotes. Maximum of three tables and figures are accepted.
The manuscript should be divided into sections. Each section should have a separate heading. Subheadings take the form of paragraph lead-ins (should be bold case), indented and run in with the text, separated by a period.
Introduction: This section should provide the reader with sufficient background information to evaluate the results of the research. An extensive review of the literature is not needed in this section. It should also give the rationale for and objectives of the study that is being reported.
Methods: Sufficient information must be provided so that the reader will understand the methodology and be able to repeat the experiment.
Results: The results section should be written in such a manner to provide information by means of text, tables and figures. Results and discussion may be combined or there may be a separate discussion section. If a discussion section is included, place extensive interpretations of results in this section. Do not repeat the results. Give numbers to figures and tables in the order in which they are mentioned in the text. All figures and tables must be cited in the text.
Conclusions and recommendations: Acknowledge personal, financial and institutional assistance at the end of this section.
References: Use the Vancouver reference system. Cite 6 references maximum.
Ethical clearance is a requirement for all researches from 2012 onward.

2. Case reports
Any case that is related to RUM will be considered. The manuscript should include the following setting: complete description of the case, consequences and outcome and finally follow up if applicable. Suggestions for solutions should be included.
Words count should not exceed 400 words.

3. Thematic topics
Any topic related to rational medicine use is considered. The manuscript should not exceed 400 words.

4. Success stories
Any story that reflects rational use of medicine and positive changes towards rational medicines use is welcomed. The manuscript should not exceed 400 words.

NOTE: Accepted manuscripts may be subjected to minor/appropriate changes prior to publishing. Please check the website for previous issues and updates www.sjrum.sd
Sudan Standard Treatment Guidelines

As part of activities targeted to improve the Rational Use of Medicines at the Directorate General of Pharmacy- Federal Ministry of Health-Sudan, the Sudan National Standard Treatment Guidelines 2014 have been published and are currently in the process of dissemination.

Standard Treatment Guidelines are invaluable in resource-constrained environments with the high burden of disease, to ensure equitable access to medicines. The objectives are to provide quality, safe, and efficacious essential medicines at affordable cost to the Sudanese people and also ensure the rational use of these medicines. For the growing National Health Insurance Fund, a standard treatment guideline is seen as a cost containment tool to ensure that inefficiencies, fraud and irresponsible poly-pharmacy are minimized.

By applying these guidelines, we will have a standard approach to manage the priority and common medical conditions in Sudan. It is envisioned that this document will also be used in pre-service training of health care workers and, as such, will be of benefit to students in medical training institutions.