

Injection prescribing patterns in public health care facilities in Egypt

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أنماط وصف الحُقن في مرافق الرعاية الصحية في القطاع العام في مصر
كارولين بودينشاتز، مها طلعت، عمرو قنديل، أنالينا لومينيفيا، إيمان رضوان، فرانك ماهوني

الخلاصة: تقيّم هذه الدراسة تكرار استخدام الحُقن والأساس المنطقي له في مرافق الرعاية الصحية في مصر، استناداً إلى المؤشرات الأساسية لمنظمة الصحة العالمية لاستخدام الأدوية. وقد راجع الباحثون 1406 وصفة دوائية في 43 مستشفى تم اختيارها عشوائياً، إلى جانب عيادتين للرعاية الصحية الأولية في محافظتين في صعيد مصر (مصر العليا) وفي شمال مصر (مصر الدنيا)، وذلك عام 2001. ووجد الباحثون أن المرضى يتلقون حقنة كل 18.1 مقابلة لهم، أما أكثر الأدوية التي توصف حقناً فكانت مضادات العدوى (56.9% من الحُقن) والمسكنات (13.7%). وتوصف الحُقن بتواتر أعلى في المستشفيات منه في عيادات الرعاية الصحية الأولية، وفي المواقع الريفية أكثر مما في المواقع الحضرية. ويمكن استبدال معظم الحُقن (94.7% منها) بمستحضرات فموية. والحاجة ماسة إلى بذل جهود إضافية لتفعيل برنامج الأدوية الأساسية في مصر لتحسين الوصف الرشيد للأدوية.

ABSTRACT This study assessed the frequency of and rationale for use of injections at health care facilities in Egypt based on WHO core drug use indicators. We reviewed 1406 prescriptions in 43 randomly selected hospitals and primary health care clinics in 2 governorates in Upper and Lower Egypt in 2001. Patients received an injection at 18.1% of encounters. The most frequently prescribed parenteral drugs were anti-infectives (56.9% of injections) and analgesics (13.7%). Injections were more often prescribed in hospitals than in primary health care clinics and in rural than in urban settings. Most injections (94.7%) could have been replaced by a suitable oral preparation. Further efforts are needed to enforce the essential medicines programme in Egypt to improve rational drug prescribing.

La prescription d'injections dans les établissements de soins de santé publique en Égypte

RÉSUMÉ Cette étude a évalué la fréquence et les raisons de l'utilisation des injections dans des établissements de soins de santé en Égypte, sur la base des indicateurs fondamentaux de l'utilisation des médicaments définis par l'OMS. Nous avons examiné 1 406 ordonnances établies dans 43 hôpitaux et centres de soins de santé primaires choisis au hasard dans deux gouvernorats de Haute et de Basse-Égypte en 2001. Les patients ont reçu une injection lors de 18,1 % des consultations. Les médicaments parentéraux les plus fréquemment prescrits étaient des anti-infectieux (56,9 % des injections) et des analgésiques (13,7 %). Les injections étaient plus souvent prescrites en milieu hospitalier que dans les centres de soins de santé primaires, et dans les zones rurales que dans les zones urbaines. La plupart des injections (94,7 %) auraient pu être remplacées par une préparation orale adaptée. Il est nécessaire de poursuivre les efforts visant à faire appliquer le programme des médicaments essentiels en Égypte afin d'encourager l'usage rationnel des médicaments.

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Introduction

The overuse of injections to administer medication is common in many countries where there is a preference for injections among health care workers and patients [1]. Studies among patients seeking care in outpatient settings in developing countries indicate that more than half are treated with injections, of which over 90% may be unnecessary or could be provided in an oral formulation [2]. Antibiotics, vitamins or analgesics are commonly prescribed by injection for upper respiratory tract infections, diarrhoea, fever or general fatigue [3].

The reasons for popular demand for injections include beliefs that injections are a "stronger" medication [4], work faster [unpublished data, Centers for Disease Control, 1998] and are a more advanced technology [5]. Among health care workers, motivations for use of injections include belief in the greater efficacy of injected drugs [6], ability to ensure compliance with treatment and financial incentives. In Egypt, injections are the preferred mode of treatment by both patients and prescribers [7]. A community-based study in Egypt revealed a higher average number of injections per person per year (4.2) compared with other low-income countries (3.4, range 1.7–11.3) [8,9].

The high prevalence of hepatitis C virus (HCV) infection in Egypt has recently been attributed to unsafe injections [10,11]. It has been hypothesized that wide-scale transmission of HCV occurred between the 1960s and 1980s during mass campaigns to treat schistosomiasis [10–12]. Although those treatment campaigns were discontinued 2 decades ago, high rates of HCV infection are still observed in all age groups of the Egyptian population, indicating that other risk factors are responsible for the sustained transmission [7].

This report provides results from a study to evaluate the frequency and type of injections prescribed in public health care facilities in 2 governorates in Egypt. The objectives of the survey were to examine the extent to which injections are prescribed at the dispensary level in public health care facilities and to evaluate the necessity of prescribed injections by medical condition.

Methods

The study was conducted in urban and rural areas of 2 governorates of Egypt: Sharqiyah (Lower Egypt) and Qena (Upper Egypt) during April and May 2001. Data were collected in the outpatient department of government hospitals and primary health care clinics.

Data collection

Information was collected through record review and patient interviews in 43 facilities (21 hospitals and 22 primary health care clinics) randomly selected from an enumerated list of all 196 government hospitals and primary health care clinics in the 2 governorates (Table 1). From each health care facility, 30 medical encounters from clinic registers of the previous day were randomly selected by systematic sampling. Additionally, 20 encounters were reviewed prospectively using a patient interview to collect information on injections prescribed in a medical encounter on the day of the interview.

The project team developed a set of quantitative drug use and prescribing indicators using World Health Organization (WHO) reference materials [13]. For each prescription examined, the following details were recorded on a structured data collection form: name of each drug, patient number, route of administration, specified

Table 1 Characteristics of selected hospitals and primary health care clinics in Sharqiyah and Gena governorates, Egypt

Public facilities	No. of facilities assessed	Location	Service provided
<i>Hospital</i>			
General hospital	2	Urban	Wide range of services
Infectious disease & specialized hospital	5	Urban/rural	Only patients with infectious diseases
District hospital	8	Urban	Wide range of services; no specialized internal department
Rural (complementary) hospital	6	Rural	Small number of beds; only minor operations
Subtotal	21	–	–
<i>Primary health care clinic</i>			
Health centre	8	Urban	Different curative services
Mother & child health centre	4	Urban	Mainly preventive services to mother and child
Health group	9	Rural	Mainly curative services
Health office	1	Urban	Preventive services, e.g. immunization; registration of births and deaths
Subtotal	22	–	–
<i>Total</i>	43	–	–

condition (if available) and patient's age and sex.

Study personnel

Egyptian physicians interested in drug use issues were recruited from the Ministry of Health and Population Field Epidemiology Training Programme to collect data for the survey. The interviewers participated in a 1-day in-service training on the basic elements of drug use indicators and the use of the data collection instruments. They performed a series of pilot interviews and assessments to standardize data responses. One trained interviewer collected data from each health facility over a period of 1 day per facility.

Data analysis of patient register

The survey data were entered into a computerized database. Descriptive analysis was performed to evaluate prescribing practices by location and to compare prescribing

practices between different sources of health care services. Coding frames were developed for the analysis of the data. Drugs were coded according to therapeutic groups as listed in the International Anatomical Therapeutic Chemical Classification System (ATC). Those drugs which had more than 1 therapeutic indication were coded according to their most common use. Penicillins, other anti-infective agents (including sulfa drugs), anti-infective dermatological drugs, anti-infective ophthalmologic agents and antidiarrhoeal drugs with streptomycin, neomycin, nifuroxazide were regarded as anti-infectives; antiamoebic, anti-giardiasis and antihelminthic drugs were not regarded as anti-infectives but classified as gastrointestinal drugs. Vaccines were excluded [13].

Diagnoses were coded according to the WHO group classification model of diseases, clinical indications and symptoms (*WHO EMLib*). Medical conditions were recorded wherever information was avail-

able. For each stated condition, injections were classified as “avoidable” when there was an oral alternative according to drug therapy recommended in standard medical texts [14].

Results

Overall, in 255 out of 1406 encounters (18.1%) patients were prescribed at least 1 injection (range 1–3 injections per encounter). In 1.4% of encounters patients received more than 1 injection. Residents of Upper Egypt were more likely to have an injection prescribed (20.1% of encounters) compared with those living in Lower Egypt (16.4%). Often injections were combined with oral medication. The age-specific rate of encounters including at least 1 injection was highest in encounters with patients aged 41–50 years (mean 28%) and lowest among those aged 21–30 years (mean 14%) (Figure

1). The mean rate of encounters with at least 1 injection was 19.0% in females and 16.8% in males.

Patients who received services in the outpatient department of a hospital were more likely to be prescribed an injection compared with those visiting a primary health care clinic (21.7% versus 13.1% of encounters) (Table 2). Injections were particularly common in rural hospitals (34.1%). When analysed by location, the frequency of encounters with an injection was higher in rural than in urban settings (25.4% versus 13.9%) (Table 2).

Among the main anatomical groups, anti-infectives were the most common injections prescribed. They were used in 56.5% of encounters, followed by parenteral analgesics (13.7%) (Table 3). Penicillins accounted for 71/255 injections prescribed (27.8%), followed by ampicillin (11.8%),

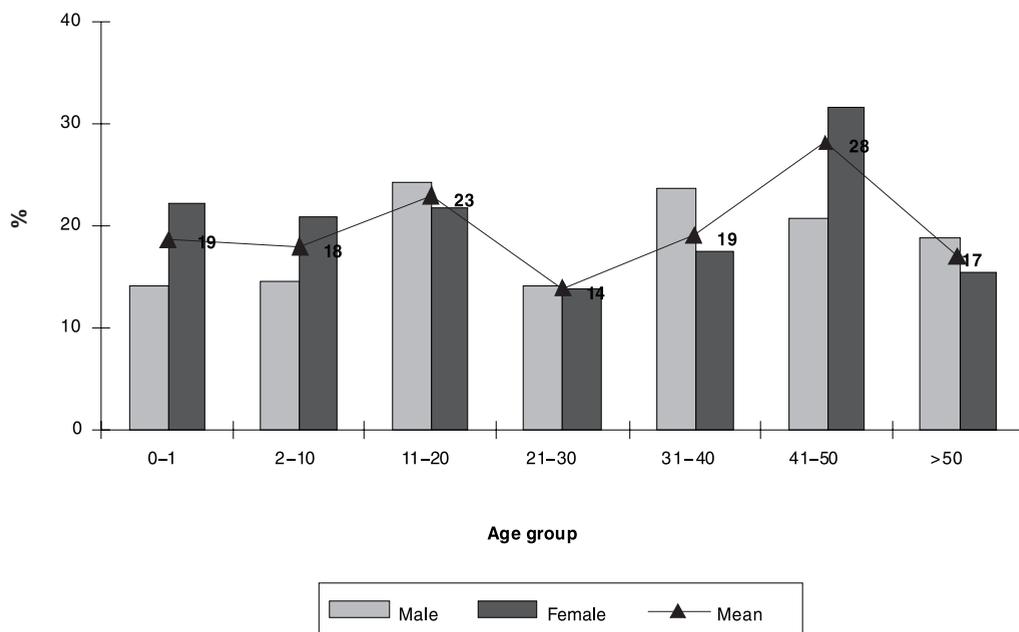


Figure 1 Age and sex specific rate of injections in public health care facilities in Egypt

Table 2 Frequency of injections prescribed by type of health care facility and location

Variable	Total no. of facilities	Total no. of encounters	Encounters with injections	
			No.	%
<i>Type of facility</i>				
Hospital	21	820	178	21.7
Clinic	22	586	77	13.1
<i>Location</i>				
Rural	15	519	132	25.4
Urban	28	887	123	13.9
<i>Total</i>	43	1406	255	18.1

dipyron (5.5%) and amoxicillin (5.1%). Of the 71 injections for penicillins, procaine penicillin G accounted for 58.2%, followed by long-acting penicillin (18.9%). When analysed by the stated diagnosis, 47.8% of the 138 parenteral antibiotics were prescribed for respiratory tract infections followed by 10.9% for dental care purposes.

Overall, 160/160 (94.7%) of all injections prescribed for a specific medical condition were judged to be avoidable, i.e. could have been replaced by an equivalent oral preparation or substituted with another oral drug. Therapeutic indications where an injection was the only suitable preparation or could not be substituted by an alternative oral agent included: postnatal vaginal bleeding (methylethylergometrine maleate) and diabetes mellitus type I (insulin) (Table 4).

Discussion

This is the first study that describes the extent and characteristics of injections prescribed in outpatient settings in government health care facilities in Egypt. The information gained from the study serves as the baseline for measuring the effectiveness of interventions undertaken to promote rational use of injections among prescribers and consumers.

Our findings are consistent with other studies in developing countries demonstrating that too many injections are prescribed in outpatient settings than are medically justified. The frequency of prescribing injections ranges from 17% to 80% in studies conducted in Ethiopia, Ghana, Morocco, Pakistan, Tanzania and Zimbabwe [15–19].

Table 3 Frequency of injections prescribed by type of medication

Type of drug	Encounters with injections	
	No.	%
Anti-infectives	145	56.9
NSAIDs	35	13.7
Hormones and other endocrine drugs; contraceptives; oxytocic/antioxytotic	31	12.2
Gastrointestinal drugs	25	9.8
Drugs affecting the blood; vitamins; other	10	3.9
Drugs acting on the respiratory tract; antiallergics, anaesthetics	9	3.5
Total	255	100.0

NSAIDs = Non-steroidal anti-inflammatory drugs.

Table 4 Evaluation of the appropriateness of parenteral drugs prescribed

Condition	No. of injections	Estimated no. of avoidable injections	Appropriate cases
Respiratory tract infections	61	61	None
Gastrointestinal disorders	26	26	None
Others (incl. fever and liver problems)	17	15	Acute disc prolapse, sciatica, dog bite
Skin diseases	13	13	None
Reproductive health	11	5	Uterine contraction; post-IUD removal; vaginal bleeding (4 cases)
Pain	10	10	None
Dental and perioral infections	10	10	None
Urinary tract infections	6	6	None
Eye or ear disorders	5	5	None
Family planning	4	4	None
Cardiovascular diseases	3	3	None
Diabetes mellitus	2	1	Diabetes mellitus type 1
Vitamin deficiencies	1	1	None
Total	169	160	9

IUD = intrauterine device.

The popularity of injections among the Egyptian population has been widely reported [9]. In this study, we found that injections were particularly popular in rural areas. Cultural differences and different education levels between urban and rural residents in Egypt may lead to different perceptions or beliefs attributed to the power of injections which may influence the demand for injections [20]. Doctor-patient relations might also differ. Frequent change of shifts and the much higher numbers of doctors working in urban health settings result in different doctor-patient relations than rural areas, which might influence prescribing. In rural areas in Egypt, medical doctors are permitted to have private clinics in the afternoon in addition to their government position in public health care facilities. Therefore, prescribing injections may increase patients' satisfaction and bring the patient back to the doctor's private clinic and/or increase his reputation as a "good

doctor" in the village. However, a more detailed qualitative and quantitative insight into the variability of actual drug prescribing between rural and urban areas in Egypt is needed.

In this study, we concluded that 94.7% of injections performed in the outpatient settings were unnecessary and could have been effectively replaced by suitable oral preparations indicated for the same medical condition. In general, parenteral therapy should be reserved for severe infections generally associated with hospitalization. This judgement might raise issues for discussion as clinicians may have valuable reasons for prescribing injections, even in an outpatient setting. In a setting of poor compliance, long-acting penicillin may be indicated to ensure compliance with treatment. Nevertheless, patient exposure to parenteral anti-infective drugs appears to be very high in Egypt. New oral agents, e.g. fluoroquinolones and cephalosporins, are available on

the market that have demonstrated similar efficacy to parenteral therapy in patients with pneumonia, urinary tract infections, skin and soft tissue infections, osteomyelitis and bacteraemia [21]. Intravenous formulations are more expensive than the equivalent oral formulations, and the preparation and administration of intravenous drugs adds significant additional costs [22].

Additional issues of concern in Egypt are the indiscriminate and inappropriate use of anti-infective drugs, regardless of the mode of delivery. For example, in this study many anti-infectives were prescribed for respiratory tract infections even though most of these infections were likely to be viral in etiology. Diagnoses that warrant antimicrobial therapy are, for example, community-acquired pneumonia, bacterial sinusitis and selected cases of acute exacerbations of chronic bronchitis. The efficacy of antibiotics to treat otitis media with effusion, acute bronchitis and rhinitis is not well established [23]. Studies conducted among family practice providers in the United States of America revealed that 79% of antibiotic prescriptions to treat respiratory tract infections were unnecessary [24]. Awareness of clinical manifestations that help to differentiate viral from bacterial infection and the use of treatment guidelines can promote the appropriate management of respiratory tract infections and rationalize the use of anti-infectives [23].

Any drug utilization study based on the WHO core drug use indicators has limitations. Determining the quality of diagnosis and evaluating the adequacy of drug choice is beyond the scope of the prescribing indicators [13]. We therefore had to accept the diagnosis or conditions stated as the starting point in assessing the appropriateness of the prescribed injections. The data for this study were from 2001. However, it is the first study that describes the extent

and characteristics of injections prescribed in outpatient settings in government health care facilities in Egypt.

Recommendations

This study established standard reference data on injection prescribing indicators, as well as on related injection use parameters, and identified priority areas for intervention. However, further studies to elaborate and strengthen the observations made are also recommended.

Interventions to improve drug use should be designed to bring about changes in behaviour. A suggested starting point is to establish Hospital Drug and Therapeutics Committees to act as "agents of change". Their main role is to optimize rational drug use by evaluating the clinical use of drugs, developing policies for drug use and administration and managing the formulary system. Public education about medicines and continuing in-service education programmes for health care workers at all levels will help to improve rational drug prescribing. As irrational use of drugs is not only widespread in public health settings, the private sector should be addressed as well. Continuous monitoring of drug utilization is strongly recommended by WHO.

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The study protocol was approved by the US Naval Medical Research Unit No. 3 Institutional Review Board (Protocol # CPHS 108 DOD 31900) and work is conducted in compliance with all Federal regulations governing the protection of human subjects.

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