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Major article

Assessment of injection practice in primary health care facilities of Shiraz, Iran

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Background: Occupational risk for several bloodborne viruses is attributable to unsafe injection practices. To understand injection frequency and safety, we surveyed injection rates and factors influencing injection prescription in primary health care facilities and associated health clinics in Shiraz, Iran.
Methods: We used both quantitative and qualitative approaches to study the frequency and safety of injections delivered in 27 primary health care facilities. We used observations and 3 data collecting tools. Patterns of 600 general practice physicians' (GPs) prescriptions were also reviewed. In-depth interviews to elicit the factors contributing to injection prescriptions were conducted.
Results: The annual per capita injection rate was 3.12. Corticosteroids were prescribed more frequently than antibiotics ($P < .001$). Knowledge of participants concerning transmission risks for 3 of the most common bloodborne infections (BBIs) was less than 75%. Factors affecting use of injections by GPs included strong patient preference for injections over oral medications and financial benefit for GPs, especially those in private practice settings.
Conclusion: Frequency of therapeutic injections in the participating facilities in Shiraz was high. Sociocultural factors in the patient community and their beliefs in the effectiveness of injections exerted influence on GP prescribing practices. Programs for appropriate and safe injection practices should target GP and injection providers, as well as patients, informing them about alternative treatments and possible complications of unnecessary and unsafe injections.

Unsafe injection practices have the potential to expose health care workers (HCWs), their patients, and their families to bloodborne viruses (BBVs) including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).[1] In 2000, the World Health Organization (WHO) reported that the occurrence of disease associated with unsafe injections was 32% for HBV, 40% for HCV, and 5% for HIV. The WHO projected 30-year, disability-adjusted life-years (DALY) associated with unsafe injections at 9.1 million.[2] One DALY can be thought of as 1 lost year of healthy life. Safe injection practices implemented through intervention policies could be cost-effective by decreasing the burden of BBVs by 96.5%, or 8.86 million DALYs, for an average yearly cost of $905 million.[3]

The frequency of injections and the proportion of unsafe injections vary by region; however, the WHO estimates that, globally, more than 16 billion injections are given annually.[2] In the 10 regions studied, the WHO indicated that overuse of injections was common, with an estimated 6.7 billion unsafe injections, including reused equipment, occurring annually.[1,4]

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Bangladesh has both high levels of injection use and unsafe injection practices,[5] whereas 77% of injecting practices observed in India were deemed unsafe.[6] In Swaziland, all observed settings were reported to use disposable syringes. However, syringes and needles were reused, and recapping needles was a common practice.[7] All HCWs interviewed in India correctly identified that unsafe injections could transmit HIV, 71% indicated that HBV could be transmitted, and none identified unsafe injection practices as being able transmit HCV.[8]

In China, injections were common, and HCWs there understood that unsafe injection practices were associated with the transmission of BBVs.[9] Most HCWs in China correctly identified that unsafe injecting practices were associated with HIV and HBV transmission (95% and 89%, respectively), whereas 59% did not recognize HCV as a potential risk.[9]

Knowledge and attitudes concerning injection safety held by HCWs in Nigeria correlated positively with the years of clinical experience.[10] Nurses in Nigeria who had more than 10 years of experience when compared with other professional groups of equivalent experience were found to be better trained and demonstrate greater knowledge and have positive attitudes toward safe injection practices.[10]

A qualitative study carried out in northern rural India reported the practice of reusing syringes, especially during tuberculosis (BCG) vaccination, and when multidose vials were used because of the desire to preserve the vaccine that remained in the death space of used syringes for further use.[11] Currently, no similar reports have been generated in Iran. Therefore, we studied the frequency and safety of injection practices and examined factors affecting injectable prescription patterns of physicians practicing in primary health care facilities in Shiraz.

METHODS

Both qualitative and quantitative methodologies were used to explore injection practices and beliefs to achieve data triangulation. The study was undertaken in 2012.

Participant source

A cross-sectional survey was undertaken in all 27 urban primary health care facilities in Shiraz, which is located in the Fars province in southwestern Iran. Shiraz has a population of over 1,500,000 inhabitants. All primary health care facilities have clinics for the provision of immunization and contraceptive injections. Both types of facilities, including government and private providers, were surveyed. One GP, 1 injection provider (nurse practitioner), and 3 to 4 patients in each facility participated. The total participants included 27 GPs, 27 injection providers (nurse practitioners), and 100 patients. If more than 1 GP or injection provider was present, a participant was randomly selected. All participants worked at their facility for at least 6 months. Patients were selected at random in the waiting room reserved for creating groups. When a patient was < 15 years of age, the parent was interviewed.

An oral informed consent was obtained from each participant prior to starting. The study was approved by the Ethical Committee of Shiraz University of Medical Sciences. SPSS version 15 (SPSS Inc, Chicago, IL) was used for data management and analysis and α was set at the 5% level.

Study 1: WHO OT8 values

We randomly selected 30 prescriptions from each of 20 randomly selected GPs for review (600 prescriptions). Randomization involved selection of specific weeks and days within these weeks. For a day to be included, there had to be at least 30 prescriptions written. If the number was less, then subsequent days were chosen to review until the desired day with 30 prescriptions was achieved. The data were examined to establish the WHO OT8 value (the number of prescriptions with at least 1 injection divided by the total amount of prescription lists surveyed).[12]

Table 1
Characteristics of participants

Participants	No.	Age, y, mean (±SD)	Sex		Experience, y, mean (±SD)
			Male, % (n)	Female, % (n)	
General physician	27	41.3 (4.6)	41 (11)	14.1 (4.3)	14.1 (4.3)
Injection provider	27	39.4 (9.3)	7 (2)	15.31 (7.5)	15.31 (7.5)
Patients	100	34.0 (13.0)	33 (33)	67 (67)	

Study 2: Injection practices using quantitative and qualitative methodology

We used the rapid assessment and response guide developed by WHO, which includes sample size calculation, 2 guides for prescribers and injection providers, a guide for interviewing patient populations, and a checklist for observation.[12] We used a semistructured, self-administered data collecting form for the GPs and injection providers. A semistructured interview was performed by a trained interviewers, and a trained observer collected information on the injection process (whether the injection was therapeutic or immunization) using a preset list of actions and topics, while observing the process.

We used the WHO Tool to investigate GP therapeutic rationale and other motives for prescribing injections as well as observing the work environment, which may influence prescribing patterns for injectable drugs.[13] The GPs participating in quantitative sessions were invited to participate in qualitative study. It was not possible to do focus group discussions because of the broad geographic dispersion of the centers and a lack of free time indicated by GPs. Instead, the GPs were interviewed and asked open-ended questions provided by the WHO Tool.[13] The in-depth interviews were conducted by 1 interviewer, who advised the participants that interviews would be recording without using identifiers. For GPs who did not give permission for audio recordings, a note taker wrote responses verbatim. Interviews lasted on average 30 to 45 minutes. Interviews were transcribed immediately and coded for primary and secondary themes. Data coding was checked by colleagues for agreement or to extract new themes. To increase credibility, extracted open codes and themes were member checked by 2 participating GPs. GP interviews continued until the data collected was considered to be saturated because no new additional themes or information were identified.

RESULTS

There were no significant differences in age ($P = .341$) or years of experience ($P = .473$) between GPs and injection providers (Table 1). There were more female injection providers than males ($P < .001$).

The rate per capita of self-reported injections per year was 3.12 among the 100 patients interviewed. The OT8 estimate for prescription written at the 27 primary care facilities was 47% (284/600). Review of these prescriptions identified corticosteroids (53%, 151/284) as the most common injectable medication followed by antibiotics (46%, 130/284). Other injection types were antiemetic and vitamins.

When asked, GPs believed the most common prescriptions for injections were for antibiotics (78%), corticosteroids (48%), and