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Major articles

Using medical student observers of infection prevention, hand hygiene, and injection safety in outpatient settings: A cross-sectional survey

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Background: Health care-associated infection outbreaks have occurred in outpatient settings due to lapses in infection prevention. However, little is known about the overall infection prevention status in outpatient environments.

Methods: A cross-sectional design was employed to assess infection prevention policies and practices at 15 outpatient sites across New Mexico in 2014 during a medical student outpatient rotation. A standardized infection prevention checklist was completed via staff interview; observations of injection safety practices and hand hygiene behavior were conducted. Aggregate data were analyzed using Excel (Microsoft, Redmond, WA) and Stata (version 12.1, Stata Corp, College Station, TX) statistical software.

Results: Medical practice staff interviews reported a mean of 92.8% (median, 96.7%; range, 75.0%-98.9%) presence of recommended policies and practices. One hundred sixty-three injection safety observations were performed that revealed medication vial rubber septums were disinfected with alcohol 78.4% (95% confidence interval [CI], 71.1%-84.7%) of the time before piercing. Three hundred thirty hand hygiene observations revealed 33.9% (95% CI, 28.8%-39.1%) use of alcohol-based handrub, 29.1% (95% CI, 24.2%-34.0%) use of soap and water, and 37.0% (95% CI, 31.8%-42.4%) use of no hand hygiene.

Discussion and Conclusion: These findings support the need for ongoing infection prevention quality improvement initiatives in outpatient settings and underscore the importance of assessing both self-report and observed behavior of infection prevention compliance.

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There has been increasing attention on health care-associated infections and the importance of infection prevention and patient safety at the national, state, and local levels during the past few decades. Whereas many surveillance and prevention efforts have been directed toward acute inpatient health care facilities (ie, hospitals), little attention has been placed on outpatient settings. With the changing health care landscape and payment incentives many elements of patient care are being shifted away from inpatient care settings and more complex care is being provided to potentially vulnerable populations in the outpatient environment.[1,2] Despite this shift leading to increasing numbers of patients being seen and procedures being performed in outpatient settings, there has not been a similar increase in infrastructure and resources directed toward outpatient infection prevention.[1-3] There has also been little or no systematic outpatient infection prevention assessment and/or planning.

Meanwhile, there have been health care-associated infection outbreaks, evidence of infection transmission, and patient notification events due to lapses in infection prevention in outpatient settings.[3-6] Yet little is known overall about the current status of infection prevention in the outpatient environment, because these settings are not typically regulated or inspected. Interaction between public health and outpatient clinics is infrequent and tends to occur when outbreaks are identified, infection prevention concerns are raised by the public, laboratories, or health care providers, or when notifiable conditions are reported.

The objectives of the project were to have medical students understand minimum expectations for safe care and infection

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prevention in the outpatient setting, assess infection prevention policies and practices, and identify infection prevention educational and quality improvement opportunities within a clinical setting.

METHODS

A cross-sectional design was employed to assess infection prevention policies and practices at 15 outpatient sites across New Mexico during summer 2014 as part of a medical student outpatient rotation. Medical students were in the beginning of their second year of education. New Mexico Department of Health (NMDOH) and University of New Mexico School of Medicine (SOM) partnered to provide a 6-week curriculum that included written and online infection prevention materials and resources, audit and observation tools and instructions, and lectures/discussion via weekly video teleconferences. The weekly video teleconferences also provided the opportunity for students to problem-solve, discuss any challenges with the project, and ask questions to clarify any content on the infection prevention checklist or data collection steps for the project. Most students did not encounter challenges during the project. Examples of issues requiring troubleshooting included finding the best place to position oneself to conduct hand hygiene observations, ways to capture injection safety observations in an office that gave infrequent injections, and how to record data when a safety element did not apply to a particular injection safety observation. Practice sites represented a convenience sample of outpatient offices that had agreed to precept medical students for their outpatient clinical rotation. The outpatient practice sites were geographically dispersed across New Mexico and were located in both rural and urban settings. Students received approval to participate from their preceptor and, before data collection began, obtained permission to record anonymous observations of office staff performing their usual patient care duties. No preceptors declined to have their visiting medical student participate. Findings from each practice site were shared confidentially with individual preceptors to provide them with information about infection prevention educational and quality improvement opportunities within their clinical setting. Institutional review board approval was not sought because this was considered a public health practice and quality improvement project and did not involve collection of any personal health information or contact with patients. However, before project commencement, the authors discussed plans and expectations in case of a serious infection prevention breach affecting patient safety. The students were to inform their SOM supervisor who would then follow-up with the SOM outpatient preceptor to gather additional information, assess the severity of the situation, and discuss measures taken to mitigate the breach. NMDOH would be notified of the breach by the SOM supervisor and NMDOH would conduct an investigation as indicated.

Data were collected to characterize outpatient sites with regard to practice setting (eg, solo practice or group practice), size of population served, preceptor specialty, and number of health care providers in the practice (ie, number of physicians, midlevel professionals, and nurses). General infection prevention policies and procedures were assessed by students through medical office staff interviews using a checklist of 14 topic areas that included 92 subelements developed by Centers for Disease Control and Prevention (CDC).[1] The CDC outpatient infection prevention checklist also served as an educational tool for students to learn about the minimum expectations for safe care. Medical office staff members were selected for interview based on the precepting physician's recommendation as to who would have the best knowledge of infection prevention policies and practices. In some cases, multiple individuals in a practice may have contributed to answering checklist questions. The infection prevention topic areas assessed included: administrative policies, education and training, occupational health, surveillance and reporting procedures, personal protection equipment, respiratory hygiene, environment cleaning, hand hygiene, injection safety, and processing of reusable instruments and devices. Responses to the 92 infection prevention subelements were recorded as "yes," "no," or "unknown." In some instances, certain infection prevention elements were not relevant to a particular practice (eg, the practice might not use flexible endoscopes and therefore did not have a policy on reprocessing these instruments) and so "N/A" was recorded to indicate this situation.

In addition to assessing injection safety policies and practices via the infection prevention checklist, injection safety practices were assessed through direct observations of medical office staff. A standardized data collection tool was developed using elements from the CDC One and Only Injection Safety Checklist.[7] Students were provided with verbal and written instructions on how to conduct the observations. The data collection tool included the following observations for each injection that was prepared/administered: "Was hand hygiene performed before preparing injection?", "Was the medication vial rubber septum disinfected with alcohol prior to piercing?", "Was a new needle and syringe used for drawing up doses of medication (even when obtaining doses for the same patient)?", and "If the vial was single dose, was the vial discarded after use?", or "If the vial was multidose, was the vial dated with an opening date?". For each injection that was observed, an observation of "yes" or "no" was recorded for each item being assessed. In some instances, the injection safety practice was not applicable to a given injection (eg, a prefilled syringe might not have a rubber septum to be disinfected with alcohol) and so "N/A" was recorded to indicate this situation. Ten injections, minimum, were observed, if possible, from a convenience sample at each outpatient practice.

Hand hygiene policies and practices were assessed via the infection prevention checklist and also through direct observation of medical office staff. After review of several hand hygiene audit tools,[8,9] a standardized data collection tool was developed and students were trained on how to conduct observations. Parameters collected included role of provider being observed (eg, physician or nurse), type of hand hygiene opportunity (eg, exam room entry or exit), and observed hand hygiene behavior (eg, alcohol-based handrub, soap and water, none, or blocked view/unsure). Each student was asked to observe a minimum of 20 hand hygiene opportunities from a convenience sample at their assigned outpatient practice.

Data analyses were conducted separately for the infection prevention checklist, injection safety observations, and hand hygiene observations. For each data collection tool, data were aggregated into an Excel (Microsoft, Redmond, WA) spreadsheet. For the infection prevention checklist, responses of "N/A," "unknown," or "missing" were not included in the denominator for calculations. For the injection safety observation portion of the project, 1 student was at a practice that performed very few injections; this student was unable to conduct any injection safety observations. Therefore the injection safety analysis only includes 14 practices. Data analyses were performed using Excel functions and Stata (version 12.1, Stata Corp, College Station, TX) statistical software. All 95% confidence intervals (CIs) were calculated using exact methods.

RESULTS

Outpatient site characteristics

Among the 15 outpatient sites included in this infection prevention assessment, there were a variety of practice types, preceptor medical specialties and number of health care providers per practice (Table 1). Information on the number of health care providers per practice was available for 14 sites.

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