

## **A prospective observational study to reduce medication errors in hospital**

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Medication errors are common in hospitals wards, and affect the quality of health systems and clinical outcomes, potentially generating adverse drug reactions (ADRs) (Agrawal et al, 2009). Medication errors can occur in different phases of the therapeutic process (prescribing, distribution, administration and monitoring) and have significant impact on morbidity and mortality. When harm arises from a medication error are potentially preventable (Bates et al.,1995). A prospective observational study was conducted on patients admitted to seven different wards (four internal medicine and three geriatric wards) of the University Hospital of Verona (Italy) to estimate, analyze ADRs due to medication errors with the aim of diminishing them through educational audit and specific tools. A three-phase study was carried out: three specialized monitors registered all suspected ADRs occurred and reviewed all inpatient charts during a three-month period (phase 1), educational audits directed to health professionals were conducted providing tools and strategies to improve safe prescription (phase 2). Phase 3 reiterated the same procedure of the first phase. Concomitantly two different panels of experts evaluated and confirmed ADRs by using a standardized method. Type, incidence, severity, and preventability of ADRs were assessed. A statistical analysis of data collected to evaluate the impact of phase 2 in reducing ADRs from medication errors was performed. Health professionals were invited and supported in sending observed ADR reports to the national pharmacovigilance system. 1,474 patients were enrolled during phase 1 and a total of 202 ADRs were detected in 116 hospitalized patients (7,9%)in addition 120 ADRs (occurred in 48 patients) were related to treatments received prior to hospital admission. Twenty-nine percent of ADRs occurring during hospitalization were assessed as preventable. 1,521 patients were enrolled during phase 3, 124 (8,1%) at least 1 ADR occurred during hospitalization while 64 patients showed 124 ADRs related to treatments received prior to hospital admission. Among the ADRs occurred during hospitalization 11% were assessed as preventable. Between phase 1 and 3 there was a large reduction of preventable ADRs ( $P < 0.001$ ). A multivariable analysis highlights a significant reduction in the risk of preventable ADR over time ( $p=0.014$ ), but, as expected, not in the risk of not preventable ADR ( $p=0.174$ ). As a matter of fact the risk of preventable ADRs nearly halved from the first to the second evaluation (Risk Relative Reduction,  $RRR=0.52$ , 95% CI 0.31-0.88), while the risk of not avoidable ADRs presented a slight, not significant increase ( $RRR=1.23$ , 95% CI 0.91-1.67). In phase 1 preventable ADRs seem to be associated with higher seriousness even if there's no statistic difference between the two phases. Wrong antibiotic or antithrombotic therapy and excessive use of diuretics were the most relevant problems reported and the most frequently involved drugs were fluoroquinolones, sartans, furosemide and heparins. The study results confirm that the reduction in preventable ADRs is achievable through educational interventions to health care professionals. The prevention of medication errors is an important task to improve the patient's health and to reduce health care costs. Strategies can be adopted in order to try to minimise risks.

