

## **Pharmacist's knowledge, certainty and risk of error in active pharmaceutical ingredients and pharmaceutical excipients: a study from Palestine**

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### **Abstract :**

**Purpose:** Pharmaceutical products contain active pharmaceutical ingredients (APIs) and pharmaceutical excipients which could be contraindicated in some patients or could cause serious adverse effects. The aim of this study was to investigate community pharmacists' knowledge of adverse effects and contraindications of pharmaceutical products, certainty and risk of error. The study also investigated the association of different factors with knowledge, certainty and risk of errors.

**Methods:** The knowledge of community pharmacists was assessed in a cross-sectional design using a multiple-choice questions test on the adverse effects and contraindications of APIs and excipients. Self-rated certainty scores were also recorded for each question. Knowledge and certainty scores were combined to estimate the risk of error.

**Results:** 129 community pharmacists completed the study and the response rate was 41%. The mean score of pharmacists was 11.0/15.0 ( $\pm 2.3$ ) and 9.3/15.0 ( $\pm 2.7$ ) in MCQs related to APIs and excipients, respectively. Scores in MCQs related to APIs and excipients positively correlated (Pearson's  $r = 0.353$ ,  $p < 0.001$ ). Knowledge on APIs was associated with the year of graduation and obtaining a license to practice pharmacy. Knowledge on excipients was associated with the degree obtained. There was higher risk of error ( $p < 0.01$ ) in questions related to excipients as compared to questions related to APIs.

**Conclusions:** The knowledge of community pharmacists who participated in our study was found to be insufficient with high risk of errors. Our study suggests a need for improving the knowledge of community pharmacists on the safety issues of medications and pharmaceutical excipients.

**Key words:** Excipients; medication errors; pharmacists; risk