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# A cross-sectional survey of medical and pharmacy students in West Virginia regarding the definition and associated consequences of polypharmacy

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## Abstract

**Objective:** The objective of this study was to examine the difference in perceptions of polypharmacy and its consequences among medical students and pharmacy students in West Virginia.

**Methods:** Current medical and pharmacy students in West Virginia completed an anonymous online survey in Qualtrics. A follow-up reminder e-mail was sent one month after the initial e-mail inviting students to participate in the survey.

**Results:** The response rate was 17.5% for medical students and 11.8% for pharmacy students. Approximately 68% of students had heard of the term polypharmacy (68.37%,  $n = 134$ ). Of those who had heard of the term polypharmacy, the most common definition was “patient taking more than five medications” (86.57%,  $n = 116$ ). The most common consequence of polypharmacy among the students was “risk of side effects” (95.52%,  $n = 128$ ).

**Conclusion:** This study found many areas of agreement between medical and pharmacy students regarding the definition of polypharmacy, but there were also some differences. Polypharmacy should have one distinct definition to reduce confusion regarding the term.

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**Keywords:** Polypharmacy; Pharmacy; Physician; Student

## What was done

This study was an anonymous online cross-sectional survey of medical and pharmacy students at two large universities in West Virginia. A reminder e-mail was sent to the students approximately one month after the initial e-mail, which invited the students to take part in this survey.

Additionally, there were no incentives offered to participate. The Marshall University Institutional Review Board approved this study.

## Why it was done

Polypharmacy is a term that is often used in health services research. Previous research contends that polypharmacy poses a significant challenge to the health care system.<sup>1–3</sup> However, the term has been measured and defined in many ways.<sup>4</sup> Some of the many definitions include diagnosis–medication mismatch, medication duplication, excessive use of medication, drug–drug interactions,

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and use of more than one pharmacy. The myriad definitions of polypharmacy have understandably caused confusion about what polypharmacy actually is among practitioners.<sup>1,4</sup> Further, the setting in which polypharmacy is used may also influence how practitioners may view or define the term.

Most health care practitioners are familiar with polypharmacy carrying a negative connotation. However, upon looking at clinical practice guidelines, most chronic diseases may require at least two medications for adequate disease control.<sup>5–7</sup> Therefore, if we measure polypharmacy strictly by the number of medications a patient is taking, then polypharmacy may be required for patients with two or more chronic conditions that require multiple medications. In fact, previous research defining polypharmacy solely as the number of medications a patient is taking, has shown that this definition may be meaningless in identifying patients who are most at risk of experiencing an adverse event.<sup>8</sup>

There is an emerging trend to identify polypharmacy in terms of the clinical appropriateness of each medication for a patient.<sup>4,8</sup> Due to the many different ways in which polypharmacy is defined and measured in the published literature, the term itself is functionally meaningless until defined by each researcher, which has understandably caused confusion in both research and the classroom.<sup>4</sup> Further, with polypharmacy having so many different definitions, it is also difficult for researchers to consistently measure polypharmacy and explain why it is such a problem for the health care system. The lack of consistency in measuring polypharmacy makes it difficult to compare interventions for polypharmacy across different studies. There have been previous attempts to standardize polypharmacy, but to date, researchers have so far been unsuccessful.<sup>1,9</sup>

Given the emphasis on ensuring that medical and pharmacy students are prepared to function on health care teams in both the Liaison Committee on Medical Education Standards and the Accreditation Council for Pharmacy Education Standards, it is important to understand how a widely used term may have different meanings to clinicians with different backgrounds.<sup>10,11</sup> To date, no research has examined medical or pharmacy students' perception of what the term polypharmacy is and what its consequences are in West Virginia. The objectives of this study were to (a) examine how many pharmacy and medical students had heard of the term polypharmacy, (b) examine pharmacy and medical students' perceptions of what polypharmacy means, and (c) examine pharmacy and medical students' perceptions of the consequences of polypharmacy.

### **Where it was done**

This study was an anonymous survey of pharmacy and medical students at two institutions in West Virginia. The data were collected from August 2014 through January 2015. The survey was sent out to a total of 589 students. The final study sample includes 196 total subjects. In total,

127 students self-identified as medical students, with a response rate of 17.5%. In total, 69 students self-identified as pharmacy students, a response rate of 11.8%.

### **How was it evaluated**

#### *Demographic characteristics*

The following variables were obtained from subject self-report: gender (dichotomous), age in years (continuous), major study (dichotomous, pharmacy vs. medicine), and year of study (categorical). The choices for year of study were as follows: (a) first year, (b) second year, (c) third year, and (d) fourth year.

#### *Polypharmacy definitions*

Subjects who reported having heard of polypharmacy were asked to rate on a 4-point Likert scale (strongly disagree, disagree, agree, and strongly agree) how much she/he agreed or disagreed with various definitions of polypharmacy that have been reported in the literature.<sup>1</sup> Students were allowed to skip questions on the survey. The following definitions were included (a) patient taking at least two medications, (b) patient taking at least three medications, (c) patient taking at least four medications, (d) patient taking at least five medications, (e) patient taking more than five medications, (f) many medications, (g) minor polypharmacy is two–four medications, (h) major polypharmacy is five or more medications, (i) medication does not match the diagnosis, (j) diagnosis no longer present, (k) two or more drugs in the same chemical/therapeutic class, (l) two or more medications to treat the same condition, (m) two or more agents with the same or similar pharmacologic actions to treat different conditions, (n) excessive use of medication, (o) unnecessary use of medication, (p) medications prescribed more than twice per day, (q) complicated drug regimen affecting compliance, (r) inappropriate dosing frequency (excessive, too low, too long, high, etc.), (s) patient misunderstanding of the use of medication, (t) dosage does not reflect age, renal, and liver status, (u) contraindicated in the elderly, (v) taking an over-the-counter (OTC) medication, an herbal product, or another person's medication, (w) availability of an equally effective, lower-cost alternative, (x) improvement after discontinuation of medications, (y) drug–drug interactions, (z) medication prescribed to treat the side effect of another medication, (aa) going to more than one physical pharmacy, and (ab) going to many physicians.

#### *Polypharmacy consequences*

Subjects who reported having heard of polypharmacy were also asked to rate on a 4-point Likert scale (strongly disagree, disagree, agree, and strongly agree) how much she/he agreed or disagreed with various consequences of polypharmacy that have been reported in the literature.<sup>12,13</sup>

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