RESEARCH

The Effect of Transitioning from Residency to Pharmacy Practice on Learning Style

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Objective: To describe the evolution of learning styles of pharmacy residents as they transition from residency to practice.

Methods: Cross-sectional survey and interview-based study. A complete provincial cohort of former pharmacy residents (N=28), who had their learning styles characterized with the Pharmacists' Inventory of Learning Styles (PILS) at the beginning of their residency and, 1 year post-residency, were invited to repeat the PILS. Interviews were administered to consenting participants to gain additional insight.

Results: Twenty-seven of the former residents (96%) completed the PILS survey and 16 (59%) completed the post-PILS interview. Thirteen (48%) changed their dominant learning style and 20 (74%) changed their secondary learning style. Six (22%) participants did not change either learning style. The overall proportion of dominant assimilators (59%) and convergers (26%) remained similar to baseline (52% and 26%, respectively), meaning participants had adopted and abandoned different learning style in similar numbers. Change in learning style was associated with being a preceptor ($p<0.05$), as 58% of the 12 former residents who became preceptors stated in the interview they had adjusted their teaching practices based on knowledge of their learning styles gained during their residency.

Conclusion: Changing learning style is common for former residents after 1 year in postresidency practice. There is no overall direction to the change; former residents transition into and out of various learning styles with similar frequency and retain preferences for passive/abstract learning approaches over active/concrete ones. The early-career lability in learning style the study demonstrated may reveal an opportunity to guide pharmacists toward more active learning preferences through residency curricula, preceptorship, and mentorship.

Keywords: Learning styles, residency

INTRODUCTION

Among pharmacy practitioners, there is a prominent perception that to continue advancing their roles, increased comfort with building therapeutic relationships with patients, closer interprofessional cooperation, and more action-oriented activities (eg, immunizing, taking physical assessment, educating) will be required.¹ Studies of pharmacy students' learning styles, in which "watching" and "abstract thinking" dominate,²⁻⁴ do not portend success in intensive socially integrated roles. Furthermore, changing students' learning styles may be more

difficult and require more deliberate efforts if preceptors and faculty members have similar learning preferences.

Keefe defined learning styles as "characteristic cognitive, affective, and psychosocial behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment."⁵ (Table 1) The manner in which learners undertake learning can impact the achievement of learning outcomes, and knowledge of learning style can help students and instructors optimize learning encounters.⁶⁻¹⁰ Importantly, learning style can change based on training experiences.¹¹

We recently demonstrated that pharmacy residents, when assessed near the beginning of their program, were predominantly assimilators, and to a lesser extent, convergers.¹² Studies have shown that the learning styles of medical students change over time, moving towards more

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Table 1. Brief Interpretation of Learning Styles and Teaching Perspectives

PILS ^a Brief Interpretation ¹
Accommodator (concrete active learning; feel and do): hands-on learner, acts on gut feeling vs logical analysis, impatient with abstraction and theory, dislikes excessive feedback and talking.
Converger (abstract active learning; think and do): practical problem-solver and decision-maker, prefers technical vs social aspects, less concerned with details and others' feelings than with success.
Assimilator (abstract passive learning; think and watch): organized, detail-oriented, enjoys creating theories/models, requires structure and rehearsal time, hard on themselves.
Diverger (concrete passive learning; feel and watch): values harmony and relationships over success, analyzes problems from various angles, prefers observation vs action, enjoys brainstorming, acutely sensitive to environment and negative feedback.

^a PILS=Pharmacists' Inventory of Learning Styles

active learning preferences like converger and accommodator.¹³ There has been no research on whether or how learning styles evolve along the continuum of training for pharmacy students and residents, or as residents transition into practice. Therefore, the primary goals of this study were (1) to characterize the changes in learning style among a cohort of pharmacists in practice for 1 year post-residency, compared to the beginning of their residency, and (2) to understand how knowledge of their learning styles has affected their clinical and professional behaviors. Characterization of participants' evolution (or lack thereof) in learning style may influence adjustments in the educational design of residency program curricula.

METHODS

Our cross-sectional survey-based study included former pharmacy practice residents in British Columbia who completed their program in June 2012 (n=28), all of whom were confirmed to be practicing in an institutional setting at the time of the study, approximately 1 year postresidency. They all also participated in our previously published study, which characterized their learning style at the beginning of their residency.¹² Participants were invited by e-mail to repeat the Pharmacists' Inventory of Learning Styles (PILS), which has a high degree of reliability and a moderate to high degree of validity in the context of pharmacy education.¹⁴ Participants were asked to disclose their type of practice setting and whether they had been trained in precepting skills. No other personal information was collected. Immediately after completion of the PILS, participants were notified by e-mail of their dominant and secondary learning style, provided with an interpretation guide, and reminded of their previously assessed learning style. A post-PILS interview was administered to consenting participants to ascertain how their knowledge of their learning style had affected their practice and/or teaching, and whether they perceived their assessed learning style to be accurate.

The study was approved by the Behavioural Research Ethics Board at the University of British Columbia.

Primary and secondary learning style were ascertained from the PILS using the method prescribed by its creators.¹⁴ Secondary learning styles provide a nuanced characterization of an individual's learning preferences and is intended to reduce stereotyping.¹⁴ Simple descriptive statistics for the survey responses were employed. Between-group comparisons, cross-tabulation and chi-square or Pearson's R inferential statistics were computed as appropriate. Data were analyzed using SPSS v.20 software (IBM, Armonk, NY) and were represented in an adapted version of Kolb's learning style quadrants model.¹⁵

RESULTS

Twenty-seven individuals (96%) of the cohort participated in the study and 16 (59%) completed the follow-up interview. The demographics of respondents are depicted in Table 2.

Figure 1 depicts the distribution of learning styles during residency vs 1 year in practice postresidency. Thirteen participants (48%) changed their dominant learning style and 20 participants (74%) changed their secondary learning style. Six (22%) participants did not change either learning style. The overall proportion of dominant assimilators (59%) and convergers (26%) remained similar to baseline (52% and 26%, respectively). Figure 2 depicts dominant learning style during residency vs in practice, plotted in quadrants describing the learning style characteristics.

Table 3 summarizes the key results. Change in learning style was seen among those who had been trained as a preceptor ($p<0.05$). The subgroup of participants who changed their learning style were more likely to adjust their professional or clinical habits in response to their learning style assessment ($p<0.05$). No other characteristics or survey responses were significantly associated with changes in learning style.

In the post-PILS interview, 56% of participants perceived an advantage in identifying their learning style during their residency and 20% adjusted their learning habits in response to this knowledge. For example, one participant, once identified as an accommodator, focused

Table 2. Demographics of Residents for the Pharmacists' Inventory of Learning Styles (PILS) (n=27)*

	n (%)
Health authority	
LMPS ^a	22 (81%)
VIHA ^b	1 (4%)
IHA ^c	2 (7%)
NHA ^d	2 (7%)
Duration of pharmacy practice including residency year and pharmacy practice prior to residency if applicable	
1-2 years	16 (59%)
3-4 years	3 (11%)
5-10 years	7 (26%)
11-20 years	1 (4%)
Residents who became preceptors	19 (70%)
Teaching experience prior to residency	20 (74%)
Teaching or preceptor training prior to residency	7 (26%)

* Female=23 (85%); age range: 24-40; age median: 27

^a LMPS=Lower Mainland Pharmacy Services

^b VIHA=Victoria Island Health Authority

^c IHA=Interior Health Authority

^d NHA=Northern Health Authority

on learning details in an effort to reduce clinical errors. Another participant identified as a converger sought the active learning experiences associated with that learning style to better learn during residency. Sixty-three percent of participants found their learning style assessment useful in their clinical practice and 25% adjusted their professional

habits in response to their result. For example, one participant identified as an assimilator used strengths associated with that learning style to observe and learn from others first, as opposed to acting on instinct. Another participant who changed from a converger to an assimilator, expressed becoming more proactive in practice. Nineteen preceptors were identified in the PILS survey, and 12 consented to a post-PILS interview. Of these 12 preceptors, 50% perceived an advantage to knowing their learning style and 58% adjusted their teaching practices as a result.

DISCUSSION

A change in dominant and/or secondary learning style was common for former residents after 1 year in practice. Although learning styles appear to be unstable during this period, there is no overall direction to the change. Former residents transition into and out of various learning styles with similar frequency. Overall, the cohort largely remained assimilators who preferred passive learning approaches. This resembles results from our previous study, which showed the distribution of learning style was identical between residents and their preceptors, who were both dominated by passive/abstract learning styles.¹² Our results contrast with those of medical residents, whose learning style shifted toward the more active assimilator or converger styles during the course of their training.¹³

While most former residents found their learning style assessment to be useful, few adjusted their learning or practice habits as a result. Former residents who took

Figure 1. Distribution of learning styles during residency vs after 1 year in practice.

Figure 2. During residency vs in-practice dominant learning style plotted in quadrants, illustrating the characteristics of learning styles.

preceptor training were more likely to change their learning style.

Despite being a complete sample of the target population, our study cohort was small and only 59% of our

participants completed the post-PILS interview. Also, our participants were previously exposed to the PILS tool and their cognizance of learning styles may have influenced their selections in the reassessment. Since we studied a single

Table 3. Comparison of Residents Who Changed Their Dominant Learning Style vs Residents who Maintained Their Original Assessed Learning Style.

	Residents who changed their dominant learning style	Residents who maintained their original learning style
PILS ^a	n=13	n=14
Preceptors	8 (62%)	11 (79%)
Previous teaching experience	9 (69%)	11 (79%)
Previous teaching or preceptor training	6 (46%)	1 (7%)
Post-PILS interview responses	n=9	n=7
Advantageous to identify baseline learning style during residency	6 (67%)	3 (43%)
Changed learning habits during residency in response to learning style assessment	1 (11%)	2 (29%)
Advantageous to identify reassessed learning style in practice	6 (67%)	4 (57%)
Changed professional habits in practice in response to learning style reassessment	4 (44%)	0 (0%)
Preceptors	8 (89%)	4 (57%)
Advantageous to identify reassessed learning style for precepting	5 out of 8 (63%)	1 out of 4 (25%)
Changed precepting habits in response to reassessed learning style	5 out of 8 (63%)	2 out of 4 (50%)
Changed relationship with students in response to learning style assessment	2 out of 8 (25%)	2 out of 4 (50%)

^a PILS = Pharmacists Inventory of Learning Styles

cohort of pharmacy residents, we are unsure how generalizable these findings are. Our study was completed in a Canadian pharmacy practice residency context and there may be differences between such programs and US programs. However, the Canadian standards¹⁶ are similar to the US standards,¹⁷ so such differences are unlikely to undermine generalization of our findings to the US context.

Despite the instability of learning styles for individuals during their residency and first year of practice, our current and previous results show that pharmacists retain their preference for passive/abstract learning approaches from the beginning of their residency through their first year in practice and beyond into preceptor roles.¹² Clearly, learning style does change in this period, but likely within the bounds of behaviors and preferences demonstrated by peers, preceptors, colleagues, and mentors. The demonstrated early-career lability of learning preferences may indicate an opportunity for residency programs and mentors to focus on coaxing learning preferences toward the active and concrete.

We acknowledge that therapeutic decision-making based on synthesizing patient data, integrating knowledge of evidence, and conceptualizing drug actions in the body do occur in an abstract, conceptual context. However, interactions with patients, physical assessment and building therapeutic relationships are action-oriented social processes. Preferences for watching may not be desirable in the socially complex, competitive, and fast-paced environment of today's health systems where, we believe, pharmacists must be willing to take action and learn by doing. Thus, we reinforce our recommendation that entry-level and residency program leaders design their curricula to steer students and residents toward more active learning (eg, role playing, group projects, peer teaching, debates, etc.) and maximize interactions with patients and other caregivers. These approaches should also be emphasized in residency accreditation standards. Finally, since our study suggests that being trained as a preceptor is associated with changes in learning style, preceptor development should include building awareness of learning styles and strategies to help residents shift their learning preferences in desirable directions.

CONCLUSIONS

Changing learning styles was common in our cohort of former residents practicing for 1 year post-residency. There was no overall direction to the change; former residents transitioned into and out of various learning styles

with similar frequency and overall retained preferences for passive/abstract learning approaches over active/concrete ones. The early-career lability of learning style the study demonstrated may reveal an opportunity to guide pharmacists toward more active learning preferences through residency curricula, preceptorship, and mentorship.

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