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Prescription Opioid Misuse among Rural Community Pharmacy Patients: Pilot Study for Screening and Implications for Future Practice and Research

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Abstract

Background—Opioid misuse imposes a disproportionately heavy burden on individuals living in rural areas. Community pharmacy has the potential to expand and coordinate with health professionals to identify and intervene with those who misuse opioids.

Objective—Rural and urban community pharmacy patients were recruited in this pilot project to describe and compare patterns of opioid misuse.

Methods—We administered a health screening survey in 4 community pharmacies among patients filling opioid medications. Univariate statistics were employed to assess differences in health characteristics and opioid medication misuse behaviors between rural and urban respondents. Multivariable statistics were employed to identify risk factors associated with rural and urban opioid misuse.

Results—A total of 333 participants completed the survey. Participants in rural settings had poorer overall health, higher pain levels, lower education, and a higher rate of unemployment compared to patients in urban pharmacies. Rural respondents with illicit drug use (AOR: 14.34, 95% CI=2.16–95.38), post-traumatic stress disorder (AOR: 5.44, 95% CI=1.52–19.50), and ≤high school education (AOR: 6.68, 95% CI=1.06–42.21) had increased risk for opioid misuse.

Conclusions—Community pharmacy represents a promising resource for potential identification of opioid misuse, particularly in rural communities. Continued research must extend these findings and work to establish collaborative services in rural settings.

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Declaration of Conflicting Interests

The authors have no conflicts.

Keywords

Drug abuse; access to care; pharmacy

Introduction

Prescription opioid misuse is a major health concern with significant economic, social, and medical consequences. US sales of prescription opioids escalated fourfold from 1999 to 2010; opioid medication overdose death rates tripled since 1990,[1] and societal costs associated with misuse are estimated to be $55.7 billion.[2] Opioid medication misuse is also associated with reduction in quality of life and a range of health comorbidities,[3] including mental health diagnoses such as mood, anxiety, and post-traumatic stress disorders (PTSD); behavioral health concerns, including drug and alcohol use problems;[4–7] and physical health issues, including painful conditions[5,7–10] and overall poor health.[6,10]

Opioid medication misuse takes a disproportionately heavy toll on individuals residing in rural areas as they are often underserved with respect to social and health services.[11–13] Much of what is known about risk factors associated with opioid medication misuse is based on urban samples, and there is limited empirical data addressing risk factors associated with rural opioid medication misuse.[14] Given the importance of understanding urban *and* rural contexts for opioid medication misuse, continued research is necessary to effectively address this complex issue.

There is a growing recognition that the community pharmacy is a valuable resource to address misuse of opioid medications,[15–19] particularly given its far reaching presence across the nation's rural and urban communities. Approximately 60,000 community pharmacies in the US employ over 170,000 pharmacists.[20] Historically, community pharmacy has primarily focused on dispensing prescription medications; however, this scope of practice is rapidly expanding with increasing emphasis on patient-centered care to optimize patient outcomes. In particular, the expanding role of pharmacists includes health education, health promotion, monitoring and supporting medication adherence, and health screening. These activities directly apply to averting misuse of opioid medications[15] in rural areas where pharmacies are often among the few locations where individuals can receive health services, especially those patients with limited resources.

Rural and urban community pharmacy patients were examined in this pilot project to describe and compare patterns of opioid medication misuse. Specifically, the objectives of this study were to: (1) Determine whether rural and urban residents differ according to health characteristics and opioid medication misuse behaviors, and (2) identify demographic and risk factors associated with rural and urban opioid medication misuse. These data provide a necessary first step for accurate identification of community pharmacy patients requiring intervention and possibly needed referrals to multidisciplinary management of opioid medication misuse.[15] Importantly, inter-professional practice is a key strategy for surmounting the dearth of resources and health challenges in rural communities,[21] and effective and efficient health services may thus be especially dependent on an interdisciplinary network of care professionals to close gaps in health services.[21]

Methods

Study Design and Participants

A health screening survey was administered in 4 community pharmacies in southwestern Pennsylvania from September 2014 to June 2015. The pharmacies were selected based on their willingness to participate in an opioid misuse screening project in conjunction with their locations in a geographic area having a high rate of misuse within Pennsylvania.[22] According to census classifications,[23] 2 pharmacies were located in rural counties and 2 in an urban county.

Study investigators trained pharmacists at each location regarding study protocols; including survey administration, documentation, and participant compensation. The trained pharmacists in turn instructed other pharmacists and staff members regarding the protocol. Pharmacists and their staff worked together to identify patients who were filling opioid pain medications at their pharmacies. Patients filling opioid medications were asked regarding their interest in participating in this anonymous survey. Those interested were handed a computer tablet on which they were screened for eligibility criteria: (1) ≥18 years of age; (2) not currently receiving cancer treatment, and (3) no previous completion of the survey. Qualified participants were prompted within the surveying program to advance to the next screen where they were informed of the details of the study, including the goals, information regarding how to contact the principal investigator, and protection of anonymity. The beginning and end of surveying program included resource information for health and social services to additional services for all patients. Completed surveys were uploaded by pharmacists and/or staff to a secure server and automatically deleted from the tablet computer. Patients not eligible were instructed to return the tablet computer. In addition, participants were informed that the study was funded by the University of Pittsburgh Central Research Development Fund and approved by the University of Pittsburgh Institutional Review Board. Qualified participants who completed the survey received a $20 gift card.

Survey Instrument and Measures

After agreeing to participate in the study, respondents completed the health screening survey consisting of 45 questions. The questions required approximately 10–15 minutes to complete. Participants provided demographic information, including sex, age, education, and employment status) along with behavioral, mental and physical health. The assessments comprising the research protocol were selected because they are brief in length in order to reduce participant burden, psychometrically sound, and have proven clinical utility.

The Prescription Opioid Misuse Index (POMI), consisting of 6 items, evaluated current opioid medication misuse.[24] The questions include topics such as doctor shopping and taking medication at higher doses or more frequently than prescribed and to cope with problems. A score of ≥2 affirmative responses indicates medication misuse.[24] Alcohol use severity was measured using the Alcohol Use Disorders Identification Test-C (AUDIT-C).[25] This questionnaire, consisting of 3 items, identifies problematic drinking. A score of ≥3 for women and ≥4 for men are the cut-offs for hazardous alcohol use.[25–27] The AUDIT-C is frequently used in health care settings with various populations.[25] The Drug Abuse

Screening Test-10 (DAST-10), consisting of 10 items, quantifies severity of substance use.[28] A score of ≥1 indicates the need for intervention.[28] The DAST-10 has demonstrated clinical validity.[29,30]

The Short-Form-12 Health Survey (SF-12) measures physical functioning and limitations due to physical health problems.[31] The SF-12 is a 12-item tool commonly recommended due to its utility and validity with a variety of patient populations.[31] The SF-12 contains single-item general health and pain subscales,[32] which utilize a 5-point Likert scale response format.

Finally, 2 scales were used to screen participants for depression and PTSD. To screen for depression, the 2-item Patient Health Questionnaire-2 (PHQ-2) was selected; a score of ≥3 indicates a positive screen.[33,34] PTSD was assessed using the 4 item Primary Care Post-Traumatic Screen Disorder (PC-PTSD) screen, with a score of ≥3 indicating PTSD.[35–37] The PC-PTSD has demonstrated validity in health care settings.[35–37]

Analyses

Comparisons between respondents in rural and urban settings were conducted using chi-square tests and t-tests to respectively examine frequency of conditions and mean group differences. Logistic regression analysis was conducted to determine whether demographic and health indicators predicted opioid medication misuse. Separate analyses were conducted for rural and urban respondents in order to delineate the factors that differentiate these two populations. The data were analyzed using Stata SE 14.1.[38]

Results

A total of 333 participants completed the screening survey across the 4 community pharmacies. The overall response rate to the survey was 71.2%. Response rates within the 4 pharmacies were: urban site 1=87.7% (100 completed from 114 approached), urban site 2: 92.3% (60 completed from 65 approached), rural site 1: 94.2% (98 completed from 104 approached), and rural site 2= 13.3% (75 completed from 565 approached). Given the lower response rate in rural site 2, we assessed whether systematic differences existed between participants from rural sites 1 and 2 using t-test and chi square statistics. These analyses were aimed at detecting differences between the samples and relationships within each sample that could have biased the results. However, no statistically significant differences were found with respect to age (p=0.12), gender (p=0.52), education level (p=0.38), employment status (p=0.44), opioid misuse (p=0.50), illicit drug use (p=0.44), hazardous alcohol use (p=0.69), pain (p=0.63), general health (p=0.89), depression (p=0.43), or PTSD (p=0.35) between rural sites 1 and 2. Accordingly, in view of the absence of statistical evidence justifying excluding rural site 2, we combined the two rural sites in tandem with combining the two urban sites.

Demographic and Health Characteristics

Demographic and health-related characteristics of the overall sample and rural and urban pharmacy locations are provided in Table 1. The majority of study participants were females (56.6%, n=188) and had an average age of 50 years (SD=12.36). A larger portion of

individuals in urban settings reported being employed (40.3%, n=64) compared to those in rural settings (22.5%, n=39; p=0.00). In terms of education, 67.1% (n=116) of respondents from rural sites possessed a ≤high school education compared to 44.3% (n=70) of participants from urban sites (p=0.00).

Prescription opioid medication misuse was detected in 15.1% (n=49) of participants, and illicit drug use in the last year was reported by 8.7% (n=29). The rural and urban samples did not significantly differ on these variables. Overall, 22.4% of participants were engaging in hazardous drinking. The participants in the urban settings reported more frequently engaging in hazardous drinking (28.5%, n=41) than those in rural settings (17%, n=27; p=0.02). A little more than a quarter of all respondents screened positive for depression (26.8%, n=88), with no differences between rural and urban participants. In addition, 16.5% (n=53) of participants screened positive for PTSD, with no differences by location. Participants in the rural settings (mean 3.75, SD=0.83) compared to urban settings (3.37, SD=1.02) reported poorer general health (p<0.001). Participants in rural settings also reported more severe pain interfering with daily activities (rural mean=3.78, SD=0.87 vs. urban mean=3.29, SD=1.25; p<0.001).

Behaviors Associated with Opioid Medication Misuse

Table 1 also displays differences between respondents in rural and urban pharmacies in behaviors that constitute misuse. A smaller percentage of rural pharmacy participants (8.1%, n=14) compared to urban pharmacy participants sought early refills (15.9%, n=25; p=0.03). Fewer rural pharmacy respondents (5.8%, n=10) reported “getting a buzz” from their opioid medication than urban pharmacy respondents (13.4%, n=21, p=0.02). No significant differences were observed on the other 4 indicators of misuse.

Factors Associated with Misuse in Rural and Urban Settings

Logistic regression analysis indicated that patients in rural settings who screened positive for illicit drug use exhibited a 14.34 (95% CI=2.16–95.38; Table 2) times increased risk for having a positive screen for opioid medication misuse compared to those who did not screen positive for illicit drug use. Furthermore, respondents in rural settings who screened positive for PTSD had a 5.44 (95% CI=1.52–19.50) times increased risk for prescription opioid misuse compared to those without a positive screen for PTSD. Participants who had a ≤high school education from rural settings had a 6.68 (95% CI=1.06–42.21) times increase in risk for opioid medication misuse compared to those who had post-secondary school education. Participants in the urban settings who reported illicit drug use in the last year had a 4.33 (95% CI=1.12–16.58) times increased risk for having a positive screen for opioid medication misuse compared to those who did not have illicit drug use.

Discussion

Prescription opioid medication misuse is a national health problem requiring united efforts that encompass diverse health disciplines to address. This study offers additional insight into the mental, behavioral, and physical aspects of health in conjunction with geographic context, namely rural and urban populations, for those who misuse opioid medications. In

brief, the main findings of this study demonstrate that patients receiving opioid medications in rural settings have poorer overall health, higher pain levels, lower education, and a higher rate of unemployment compared to patients accessing urban pharmacies. Fewer participants in the rural than urban pharmacy settings reported early prescription refills and experiencing a medication “buzz.” Further, patients in rural settings also reported several risk factors that contributed to significantly higher risk for misusing prescription opioids. These differences point to the need to address distinct indicators of risk for patients in each type of setting.

Risk for Opioid Medication Misuse and Rural Pharmacies

Previous research has similarly documented that urban populations report higher rates of opioid medication misuse.[14] The higher rate notwithstanding, opioid medication misuse and risk of overdose are particularly problematic in rural communities.[14,39,40] Previous research has reported, for example, higher rates of other illicit substances, opioid medications in drug use histories,[40,41] and use of opioid combination products among rural populations.[41] The findings reported herein largely confirm prior research by demonstrating that rural respondents with illicit drug use in the last year had a 14.34 (95% CI=2.16–95.38) times higher risk for misusing opioid medications.

Several factors contribute to higher rates of opioid medication misuse related to illicit drug use in rural communities, including paucity of treatment resources and lack of high quality services.[42,43] Moreover, substance use treatment in rural communities is more often initiated through a referral from the criminal justice system than through individuals seeking care.[44] Mental health additionally appears to be an important factor. Similar to our findings, previous research has documented increased consumption of opioid painkillers and other psychoactive medications among rural patients with PTSD,[45] and a PTSD diagnosis has been found to be associated with non-fatal overdose events among rural drug users.[46] Indeed, social stigma likely is a salient barrier to behavioral and mental health treatment in rural areas.[47–49] Potentially, community pharmacy is an effective resource to attenuate stigma in view of the ubiquity of these locations[20] and general public trust in pharmacists.[50]

It is also noteworthy that participants with lower levels of education were more likely to misuse opioid medications. These findings concur with previous research showing that patients in rural settings with lower education are more likely to misuse prescription opioids.[41] This risk factor of lower levels of education is an important piece of data clinicians may carry into practice in order to be actively aware and sensitive to possible patient needs.

Comorbid Health Differences

Participants residing in rural settings who receive opioid medications reported poorer overall health and more severe pain compared to those living in urban settings. These findings are supported by recent research, which has shown that among patients with chronic non-malignant chronic pain, living in rural settings increases the odds for receiving an opioid pain medication prescription nearly threefold compared to those living in urban locations.[51] Mental and behavioral health characteristics did not significantly differ proportionally with the exception that a larger portion of patients in urban settings sought early refills, reported

psychoactive effects of pain medication, and engaged in hazardous drinking compared to patients in urban settings (hazardous drinking: urban 28.5% vs. rural 17%). Higher rates of hazardous alcohol use are clearly problematic and should be addressed by urban *and* rural health care professionals. Excessive alcohol use, even under conditions of adherence to the opioid prescription regimen, amplifies risk for overdose.[52–54]

Recommendations to Address Opioid Medication Misuse

To enhance clinical and system-level responses to address opioid medication misuse in the US, it is critical that community pharmacists continue to work to identify patients engaged in misuse or at-risk for misusing opioids. With such information, appropriate referrals from pharmacists to patients for treatment services could possibly be provided. Screening patients requires tools and additional training beyond what pharmacists typically possess,[17] which may be especially challenging in rural communities where health services for referral are limited.

Accordingly, enhancing training for pharmacists may require new education and training opportunities. These efforts could include curriculum designed to equip pharmacists with the capacity to accurately screen patients with brief and valid screening tools, such as those employed in the current project. Further, curriculum also may focus training on techniques and materials for providing appropriate referrals to patients with possible needs. In addition to screening and referral, future research could explore the possibility of pharmacist led adherence interventions for patients engaged in misuse. Adherence focused interventions have shown effectiveness in a number of previous studies for improving adherence to other classes of medications.[55–59] Such pharmacist led adherence interventions also closely aligns with pharmacy strengths, values, medication consulting guidelines/reimbursement.[60–63] The development and testing of models to address opioid medication misuse could provide necessary foundational evidence to help propel increased establishment of behavioral health services and care collaboration in rural settings.

Limitations

Limitations to our project design/study sample and measures have been described previously[19] and are discussed here only summarily. Despite the strength of this study in terms of its regional sample, its findings are nevertheless limited in that they should only be applied to other populations with similar characteristics. Future research should work to expand such proactive screening in community pharmacies statewide or nationally in order to enhance external validity of the findings herein. This future work should also consider including other types of pharmacy settings, including chain and health care settings, in order to examine possible differences in results between these distinct locations for patients and practitioners. Furthermore, study respondents were only asked to answer questions from validated and reliable brief screening instruments in order to reduce patient burden and maximize the variety of health conditions assessed within the fast-paced pharmacy workflow. Future research should work to assess patients with comprehensive assessments with possible biochemical validation in order to gain a more thorough understanding of patients' health profiles as well as severity of the various health conditions assessed.

In addition to these limitations, an important consideration for our multivariable results is we recognize cross-sample comparisons of odds ratios can be limited based on the possibility of unobserved heterogeneity.[64,65] However, visual inspection of the rural versus urban models showed consistently higher coefficients for the rural sample indicating less unobserved heterogeneity between groups[64,65]—thus likely producing odds ratios that can be compared.

Finally, we acknowledge that the moderately wide confidence intervals for illicit drug use in the last year and ≤high school education predicting opioid medication misuse (Table 2) likely resulted from our limited sample size of the rural only and urban only multivariable analyses, which may have increased variability among these indicators. Given the pilot nature of the project itself, limited funding, and the exploratory intent of the current analyses; the results herein nevertheless present an important first step into better understanding the health of patients filling opioid pain medications in community pharmacy settings and the critical future work that must now take place to better serve the needs of these individuals. Future work should seek to replicate the findings herein and recruit a larger sample and thus possibly produce more robust estimates of anticipated associations.

Conclusion

This study provides important preliminary evidence that patients in rural community pharmacy settings filling opioid medications who have illicit drug use in the last year, are positive for PTSD, and/or have lower degrees of education have heighted risk of opioid medication misuse. These data are congruent with previously published epidemiological and clinical studies. Community pharmacy represents a major resource in the nation in terms of presence and reach, particularly in rural communities where other health and social services are limited. Future research should examine routine screening in rural community pharmacy for the purpose of possible pharmacist led screening, adherence interventions, and referral services for patients with identified needs. These efforts have potential to add to the national response to opioid medication misuse and improve the health and wellbeing of the individuals at risk or engaged in misuse.

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Table 1

Respondent Characteristics and Misuse Behaviors by Urban and Rural Settings (N=333; Urban=160, Rural=173)

		Pharmacy			
Health Characteristics	**Total % (n)**	**Urban %(n)**	**Rural %(n)**	**X^2 (df)**	**P**
Prescription opioid misuse	15.1(49)	17.6(27)	12.8(22)	1.49(1)	0.22
Illicit drug use	8.7(29)	11.2(18)	6.4(11)	2.50(1)	0.11
Hazard alcohol use	22.4(68)	28.5(41)	17(27)	5.73(1)	0.02
Depression	26.8(88)	21.5(34)	31.2(54)	3.98(1)	0.05
Post-traumatic stress disorder	16.5(53)	14.5(22)	18.2(31)	0.83(1)	0.36
General Health[ab]	3.57(0.94)	3.37(1.02)	3.75(0.83)	−3.76(323)	<0.001
Pain Interference[ab]	3.55(1.09)	3.29(1.25)	3.78(0.87)	−4.24(327)	<0.001
Demographics					
Female	56.6(188)	51.6(82)	61.3(106)	3.17(1)	0.08
Age[a]	49.8(12.36)	50.3(13.65)	49.3(10.98)	0.72(316)	0.47
Education					
High school or less	56.2(186)	44.3(70)	67.1(116)	17.36(1)	0.00
More than high school	43.8(145)	55.7(88)	32.9(57)		
Employment Status					
Not employed	69(229)	59.7(95)	77.5(134)	12.14(1)	0.00
Employed	31(103)	40.3(64)	22.5(39)		
Misuse Behaviors					
Taking more medication than prescribed	12.8(42)	14.2(22)	11.6(20)	0.48(1)	0.49
Taking medication too often	23.6(78)	21.5(34)	25.4(44)	0.70(1)	0.40
Early Refills	11.8(39)	15.9(25)	8.1(14)	4.84(1)	0.03
Medication Buzz	9.4(31)	13.4(21)	5.8(10)	5.58(1)	0.02
Medication to deal with problems	3.3(11)	3.2(5)	3.5(6)	0.02(1)	0.90
Doctor shopping	1.8(6)	1.9(3)	1.7(3)	0.01(1)[c]	1.00

[a]Mean (SD), t, df;

[b]5-point Likert scale with higher scores indicating worse condition;

[c] Fisher's exact test.

Table 2

Associations between Misuse and Health Conditions in Logistic Regression Models in Urban and Rural Settings (N=333; Urban=160, Rural=173)

	Urban			Rural		
Indicator	**OR (SE)**	***p***	**95% CI**	**OR (SE)**	***p***	**95% CI**
Illicit drug use	4.33(2.9)	0.03	1.12–16.58	14.34(13.9)	0.01	2.16–95.38
Hazardous alcohol Use	1.09(0.6)	0.89	0.348–3.40	1.70(1.2)	0.46	0.41–6.99
Depression	2.73(1.8)	0.12	0.77–9.63	2.75(1.8)	0.13	0.75–10.06
Post-traumatic stress disorder	2.79(1.7)	0.09	0.85–9.16	5.44(3.5)	0.01	1.52–19.50
General health	0.91(0.3)	0.77	0.49–1.69	0.91(0.4)	0.82	0.40–2.09
Pain interference	1.16(.3)	0.54	0.72–1.85	1.53(0.7)	0.32	0.67–3.53
Age	0.98(0.0)	0.23	0.94–1.02	1.03(0.0)	0.33	0.97–1.10
Gender	1.11(0.6)	0.86	0.37–3.31	0.56(0.3)	0.34	0.17–1.84
High school or less	1.07(0.6)	0.90	0.36–3.21	6.68(6.3)	0.04	1.06–42.21
Employed	1.06(0.6)	0.92	0.33–3.35	4.10(3.4)	0.09	0.82–20.52

OR, odds ratio; SE, standard error; CI, confidence interval