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Evaluating the Impact of Pharmacist Health Education on the Perceptions of the Pharmacist's Role Among Women Living in a Homeless Shelter

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Original Research

Evaluating the impact of pharmacist health education on the perceptions of the pharmacist's role among women living in a homeless shelter

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ABSTRACT[*]

Objectives: To determine the impact of pharmacist-provided educational seminars on the participant's perception of the pharmacist's role in providing women's health education. Secondary objectives include the participant's level of perceived benefit from the information provided during each presentation, as well as determining characteristics of participants who are interested in attending seminars.

Methods: This is a prospective study conducted within a homeless women's shelter in Phoenix, Arizona. Pharmacists and pharmacy students provided 10 monthly educational seminars on topics related to women's health. Participants completed a pre- and post-seminar survey regarding their perceptions of the presentations and pharmacists.

Results: Fifty-six participants attended at least one of 10 seminars from January to November 2014. The average age was 46 years old, taking approximately 3 medications, and 66% completed a high school degree or lower. Prior to the presentations, 30% of participants agreed or strongly agreed that they would seek advice from a pharmacist on the topic presented, which increased significantly to 82% of participants after the presentation ($p<0.001$). Similarly, 55% of participants rated themselves as agreeing or strongly agreeing with being knowledgeable on the topic presented prior to the presentation, and this increased significantly to 77% after the presentation ($p=0.001$). After attending the educational session, 70% of participants agreed or strongly agreed that they would make changes to their health, and that they would attend an additional session. The participants noted their increased learning about the topic, the clarity of visual aids and presentation, and knowledge of the presenters as the best parts of the presentation.

Conclusion: Pharmacist's participation in providing educational seminars in the homeless women's population increases the participant's knowledge and perception of the pharmacist's role within the population. Future studies can further investigate an evolving role of pharmacists in optimizing healthcare in the homeless population.

Keywords: Homeless Persons; Women's Health; Health Education; Pharmacists; Students, Pharmacy; Professional Role; United States

INTRODUCTION

Homeless women and families are an increasing proportion of the homeless population, with estimates of up to one-third of the homeless population.[1,2] This is a concern for both the women's health and the health of their families as women are often the primary caretaker of their children's health.[2] Homeless women have multiple barriers to healthcare access, including cost, transportation, adverse effects, and uncertainty about where to go.[2,3] Even women who have access to some healthcare have concerns about their knowledge of paperwork, experiences with providers, fears about testing, and challenges with taking medicines.[1] A study of medication adherence in asthmatic patients in the underserved population found that 70% of patients had at least one type of barrier that affected asthma medication adherence.[4] Approximately 40% of patients had a knowledge barrier, and 40% of patients had a belief barrier, which included low self-efficacy about self-management, doubt benefit of medication, and a fear of long-term effects of medication. However, compared to patients with a knowledge barrier, patients who had belief barriers were associated with significantly worse disease control.[4]

A focus group exploring health needs and perspectives of middle-aged homeless women concluded that refresher courses related to sexually transmitted diseases, cardiovascular disease, and vision and dental care would be of higher priority.[1] Potentially, greater comprehension of these disease states may promote higher medication adherence. The level of medical literacy is also an area of concern because while lower medical literacy was not associated with the women who reported a medication barrier for themselves, women with lower health literacy were more likely to report a barrier to giving medications to their children.[2] The optimal format in which information is provided which may help improve health literacy would be short, simple, and color-coded pamphlets or handbooks.[1] The vast majority of the women also preferred to receive both oral and written information, and approximately 80% listed a pharmacist as the first or second choice for medication information.[2]

Pharmacists are integral members of the healthcare team, and their inclusion in management of chronic disease therapy has demonstrated their benefits in helping patients to achieve therapeutic goals in chronic disease states, such as hypertension, hyperlipidemia, diabetes and chronic obstructive

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pulmonary disease.[5-9] In the underserved population, pharmacists as part of a multidisciplinary team have helped homeless patients with diabetes, hypertension, and/or hyperlipidemia achieve therapeutic goals, identify medication-related problems, and provide cost-savings.[10-12] A report of a collaboration between a college of pharmacy and a community center that serves the homeless, uninsured and underinsured population showed that this academic-community partnership led to high satisfaction with the clinic providers and staff regarding pharmacy services, as well as improved quality of medication use.[13]

Within the homeless population, there has been limited information on the effect of short educational interventions, separate from other direct interventions such as pharmacotherapy or laboratory testing. A study found that short-term nutrition educational sessions can significantly improve low-income women's nutrition knowledge and behavioral changes, based on pre-and post-intervention surveys.[14] However, the impact of pharmacist-provided educational topic seminars on the homeless women's attitude and behaviors toward pharmacists has not been evaluated. Thus, this study aims to determine the effect of pharmacists providing women's health education on the change in attitudes and behaviors in this population.

METHODS

This prospective, 12-month long study was conducted with female adult residents at the United Methodist Outreach Ministries Watkins basic needs shelter, which is a shelter for homeless women and children in Phoenix, Arizona. Pharmacists and pharmacy students, as part of an interprofessional healthcare team, provided medical services to the residents of the shelter every two weeks. The healthcare team also consisted of physicians, physician assistants, dentists, and podiatrists, along with students of each profession from Midwestern University in Glendale, Arizona.

Monthly educational seminars were provided by a pharmacist and a pharmacy student to interested residents of the homeless shelter. Each seminar included a 20-30 minute PowerPoint presentation in English, and the participants were encouraged to ask questions and discuss their concerns both during and after the presentation. Participating residents were provided with a summary one-page handout of the topic in English for each presentation. The PowerPoint presentations and summary handout were primarily comprised of pictures, large charts and tables, and short bullet-pointed information. The handouts were formatted similar to an educational pamphlet, with information in large, easy-to-read fonts, and summarized the major educational points of the presentation. Each presentation was focused on topics pertinent to women's health, which included urinary tract infection and yeast infection, menopause, bone health, natural remedies, diabetes and foot care, hypertension, stroke prevention, cold and flu, smoking cessation, and "know your numbers". The "know your numbers" presentation focused on therapeutic goal ranges and treatment for hypertension, hyperlipidemia and diabetes. Topics were chosen based on a combination of timely disease state discussions (cold and flu presentation during flu season) and participant's feedback.

The criteria for inclusion into this study were adult residents at the United Methodist Outreach Ministries Watkins shelter who were interested in attending the educational seminar. There were no specific exclusion criteria for participant recruitment. This study was approved by the Midwestern University's Institutional Review Board, and each participant was given notice of an informed consent prior to each monthly presentation. Residents were able to attend presentations without completing the study surveys.

The participant's demographic data was obtained by self-administered surveys prior to and after each presentation. The pre-presentation survey was in English only and included questions regarding age, ethnicity, number of children, education level, reason for attending the presentation, the participant's self-reported knowledge on the presented health topics, and utilization of pharmacy services. The post-presentation survey was given at the conclusion of each presentation and included questions regarding the participants' knowledge on the presented health topics, willingness to utilize pharmacy services, and the level of impact their attendance had on their health. On both the pre- and post-surveys, the participants were asked to assess their own knowledge and desire to utilize pharmacy services on a 4-point Likert scale. In addition, there were four open-ended questions that sought to identify what the participants liked most and least about the presentation, suggestions for improvement, and suggested future educational presentations. Anonymity was obtained by assigning each participant with a designated number to match the pre- and post- surveys, though different numbers were used if the resident attended multiple sessions.

The primary objective of this study is to determine the impact of the pharmacist-provided educational seminars on the participant's perception of the pharmacist's role in providing women's health education. This was measured by the change in the patient's confidence level in pharmacists prior to compared to after attending the presentation. Secondary objectives include the participant's level of perceived benefit from the information provided during each presentation, as well as determining characteristics of participants who are interested in attending seminars.

RESULTS

Ten women's health education sessions were offered between the months of January to November 2014. Overall, 56 participants attended at least one of the offered sessions within the educational series. The characteristics of the educational session participants are shown in Table 1. A majority of participants (51.8%) reported

Table 1. Participant characteristics

Characteristic	Representation (n=56)
Ethnicity, no. (%)	
White, non – Hispanic	27 (48.2)
African American	9 (16.0)
Hispanic	7 (12.5)
Native American	5 (9.0)
Other or not answered	8 (14.3)
Age, mean (SD) [range]	46.8 (13.10) [18 - 63]
Number of prescription medications taken daily, mean (SD) [range]	2.98 (4.25) [0 - 15]
Number of OTC medications taken daily, mean (SD) [range]	0.90 (1.61) [0 - 9]
Pregnancy status	
Pregnant, no. (%)	3 (5.35)
Not pregnant, no. (%)	50 (89.3)
Not answered, no. (%)	3 (5.35)
Highest educational level, as reported by patients, no. (%)	
Some high school coursework completed, no high school degree obtained	7 (12.5)
General Education Development (GED) degree obtained	13 (23.2)
High school degree obtained	17 (30.4)
Some college coursework completed, no college degree obtained	6 (10.7)
College degree obtained	6 (10.7)
Graduate school degree obtained	4 (7.1)
Not answered	3 (5.4)
Pt reported reason for attending the educational session, no (%)	
I was interested in learning more on the topic of the day	29 (51.8)
My friends were attending the presentation	6 (10.7)
I have attended other sessions and have benefited from them	1 (1.8)
Other	11 (19.6)
Multiple answers provided	4 (7.1)
Blank	5 (9.0)

presenting to the educational session because they were interested in learning more about the presentation topic of the day. One participant reported presenting to the educational session because attending an alternative session was beneficial, suggesting there was at least one repeat participant. The specific topics covered and the number of homeless shelter participants present at each session are listed in Table 2. Five student pharmacists were involved with creating and independently leading at least one educational session.

All 56 participants provided some information within either the pre- or post-session survey. Nine participants provided pre-session data, but did not provide data for post-session Likert-scale survey questions. An additional four participants did not complete the pre-session survey in entirety. Thus, responses from 43 participants were included in statistical analysis of matched survey questions. A summary of the results from the Likert-scale items is shown in Table 3. A Wilcoxon Signed-Ranks Test indicated that patient's willingness to seek pharmacist advice after attending the educational session was statistically significantly higher than their willingness to seek pharmacist advice on the presentation topic of the day prior to the session (Z= -5.18, p=0.000). Patient perception on their knowledge regarding the presented topic was also statistically significantly higher after attending the presentation (Z= -3.38, p=0.001). After attending the educational session, a majority of participants (greater than 50%) agreed or strongly agreed that they would make changes to their health, and that they would attend an additional educational session.

The open-ended questions asked what the participants liked most and least about the educational topic presentation and suggestions for improvement (Table 4). With regards to what they liked the most, the participants most commonly stated that their learning was enhanced regarding the topic by attendance at the educational presentation. Other commonly reported responses included ease of understanding due to the visual aid provided and the presentation style, and the presenters were knowledgeable on the topic. The majority of the responses to what was liked least cited nothing. Other common responses included other presentation attendees, and learning how women are affected by the presentation topic. The

Table 2. Attendance at each educational session

Presentation topic	Presentation date	Attendance*
Urinary Tract Infections (UTI) and Yeast Infections	1/13/14	10
Menopause	2/3/14	7
Bone Health	3/17/14	6
Natural Remedies	4/14/14	4
Diabetes and Foot Care	5/27/14	7
Hypertension	7/7/14	5
Stroke Prevention	8/6/14	5
Cold and Flu	9/29/14	5
Smoking Cessation	10/27/14	5
"Know Your Numbers"	11/24/14	2
*UMOM Watkins serves up to 145 women and children nightly.		

Table 3. Participant evaluation of educational sessions

Matched Questions appearing on pre- and post-session surveys			
Statement			**Wilcoxon Signed Ranks Test***
I would seek advice from a pharmacist on the topic of the day			
	Pre	**Post**	
Strongly agree (%)	12	37	Z = -5.18, p = 0.000
Agree (%)	18	45	
Disagree (%)	27	4	
Strongly Disagree (%)	32	0	
Blank (%)	11	14	
I would describe myself as "knowledgeable" on the topic of the day			
Strongly agree (%)	23	34	Z = -3.38, p = 0.001
Agree (%)	32	43	
Disagree (%)	29	5	
Strongly Disagree (%)	7	2	
Blank (%)	9	16	
Questions appearing only on post-session surveys			
I will make changes to my health after attending the educational topic presentation			
Strongly agree (%)	-	32	-
Agree (%)	-	38	
Disagree (%)	-	9	
Strongly Disagree (%)	-	5	
Blank (%)	-	16	
I would attend an additional educational presentation			
Strongly agree (%)	-	43	-
Agree (%)	-	32	
Disagree (%)	-	7	
Strongly Disagree (%)	-	4	
Blank (%)	-	14	

*N=43 Matched Pairs

most frequent response for how to improve the process stated no improvements/nothing. Other suggestions included providing additional example pictures, handouts, and information on the subject, and providing samples during the presentation. The question regarding what additional presentations the participants would like to see in the future was used to plan subsequent educational topic presentations.

DISCUSSION

This study provides evidence that pharmacists can be an effective resource for providing education to the underserved women's population. The most common characteristics of women attending our education sessions were white, middle-aged women taking an average of three medications. Most participants either had some high school education or obtained a General Education Development degree, and were mainly interested in learning more about the topic of the day. Compared to before the presentations, the women participants were significantly more likely to seek a pharmacist for advice as well as rate themselves as knowledgeable after attending the seminar. Our findings are similar to the results of educational seminars provided by nutritionists to low-income women.[14]

The wide variety of future educational topics requested (Table 4) support the continued offering of similar presentations. The exposure to a pharmacist's knowledge and resources will help these homeless and low-income women in the shelter have another resource for health information and recommendations. Utilizing all their available resources, and in a timely manner, may provide higher medication adherence, earlier and better treatment for chronic disease states, and reduce the number of hospital and emergency room visit for disease state complications.

The format of the educational presentations and handouts were also targeted toward this population. Based on previous surveys of the optimal format of information toward a homeless or lower-income population,[1,2] our PowerPoint presentations and educational handouts were created in an easy-to-read format, with pictures and information in short bullet-points. The educational handouts summarized the main points of the presentation and included practical counseling points about the disease state and medications. This was one of the areas that the participants enjoyed most about these presentations. Question and answer discussions were also encouraged both during and after the presentation to discuss concepts that were unclear. The participating women felt that the format of the sessions were clear and easy to understand, which likely led to conclusion that the pharmacists were knowledgeable and that they would make changes in their health after the presentation.

Strengths of the study include evaluating a novel role of pharmacists in the homeless population. The seminars presented were focused on the topics that were most relevant to women, and the large number of participants were from a wide variety of ethnic and educational backgrounds in a large metropolitan area. Providing the educational seminars concurrently with the multidisciplinary medical clinics gave the patients the opportunity to be seen by the medical teams if the presentation highlighted something that the patient had been questioning about their health. For example, the hypertension presentation may have encourage the participants to have their blood pressure checked. Additionally, it was a benefit for the pharmacy

Table 4. Participant comments about the educational topic presentation

	Number of comments
What did you like most about the educational topic presentation	
Increased learning about the topic	20
Visual aids used were easy to understand/ presentations were clear	12
Presenters were knowledgeable/informative on the subject	9
Miscellaneous	4
Understanding of the availability of a pharmacist	1
Interaction with the other attendees	1
What did you like least about the educational topic presentation	
Nothing	20
Other presentation attendees	15
Learning more about the topic and how it affects women	8
Location/noise distraction	2
Time	2
How would you like to change or improve the educational topic presentation	
Nothing	19
Provide additional example pictures/handouts	5
Provide sample products	3
Provide additional information on the subject	3
Provide additional time at the end for questions	1
What additional educational topic presentations would you like to see offered in the future	
Dieting/Exercise	6
Muscle pain/fibromyalgia	3
Mental health topics and medications	3
Bone and skin health	2
Prevention of sexual transmitted diseases	2
Diabetes foot and nail care	2
Cigarette smoking	2
Vision and eye care	2
Memory loss	1
Cancer in women	1
Effects of cosmetic supplies on health	1
Drug-drug interactions	1
Cholesterol	1
Hormone replacement therapy	1
High blood pressure	1
Cold and Flu	1
Alcohol consumption	1
Oral health	1
Polycystic ovarian syndrome	1

students to participate in this study as it allowed them to re-familiarize themselves with a disease state as well as learn to communicate with the homeless population. Expansion of these pharmacy services can also potentially improve the academic-community center partnership as seen in another report from a college of pharmacy.[13] The participants highly rated the knowledge and clear delivery of the presentations, so they also appreciated the pharmacy students' participation. Since the homeless women population is seldom studied, the information gathered from this study about women's preferences will be of benefit for future studies. Some limitations to our study include evaluation only at a single shelter in Phoenix, Arizona, which could skew study findings. The presentations and survey were not validated within a homeless population, which could also affect the survey results. In addition, the study measured the women's perception of their knowledge, instead of objectively measuring their actual knowledge with an exam. Potentially, the participants could have had low health literacy, which could have impacted their ability to answer the survey.

CONCLUSIONS

This study shows that short and concise women's health seminars with educational handouts by pharmacists can improve the knowledge base of the homeless women's population. These discussions also serve to introduce pharmacists as a reliable and knowledgeable source of medical information to a high-risk population. Future studies in this area should focus on educational topics that are most relevant to women's health, as well as expanding the role of pharmacists in this population.

CONFLICT OF INTEREST

The authors declare no conflict of interest or funding support.

EVALUACIÓN DEL IMPACTO DE LA EDUCACIÓN SANITARIA POR EL FARMACÉUTICO SOBRE LAS PERCEPCIONES DEL PAPEL DEL FARMACÉUTICO ENTRE MUJERES QUE VIVEN EN UN REFUGIO DE PERSONAS SIN HOGAR

RESUMEN

Objetivos: Determinar el impacto de seminarios educativos proporcionados por farmacéuticos sobre la percepción de los participantes del papel del

farmacéutico en la provisión de educación sanitaria a mujeres. Los objetivos secundarios incluyeron el nivel del participante del beneficio percibido de la información proporcionada durante cada presentación, así como las características determinantes de los participantes que estaban interesados en asistir a los seminarios.
Métodos: Este es un estudio prospectivo realizado en un refugio de mujeres sin hogar en Phoenix, Arizona. Farmacéuticos y estudiantes de farmacia proporcionaron unos seminarios educativos durante 10 meses sobre asuntos relacionados con salud de la mujer. Los participantes completaron un cuestionario pre- y post-seminario sobre sus percepciones de las pr4sentaciones y de los farmacéuticos.
Resultados: 56 participantes asistieron al menos a uno de los 10 seminarios entre enero y noviembre de 2014. La media de edad fue de 46 años, tomando aproximadamente 3 medicamentos, y el 66% había acabado la educación secundaria o menos. Antes de las presentaciones, el 30% de los participantes concordaba o concordaba fuertemente que buscarían consejo en un farmacéutico sobre el asunto presentado, lo que aumentaba significativamente al 82% después de la presentación (p<0,001). Del mismo modo, el 55% de los participantes se calificó como de acuerdo o fuertemente de acuerdo con saber suficientemente del asunto antes de la presentación, y esto aumentó significativamente al 77% después de la presentación (p=0,001). Después de asistir a la sesión educativa, el 70 % de los participantes concordó o fuertemente concordó que harían cambios en su salud, y que asistirían a otra sesión. Los participantes señalaron su aumento de aprendizaje sobre el asunto, la claridad de las ayudas visuales y la presentación, y el conocimiento de los presentadores como las mejores partes de la presentación.
Conclusión: La participación del farmacéutico proporcionando seminarios educativos a una población de mujeres sin hogar aumenta el conocimiento de las participantes y la percepción del papel del farmacéutico en esta población. Próximos estudios pueden investigar en detalle el papel en evolución del farmacéutico optimizando los cuidados de salud de la población sin hogar.

Palabras clave: Personas sin Hogar; Servicios de Salud para Mujeres; Educación en Salud; Farmacéuticos; Estudiantes de Farmacia; Papel Profesional; Estados Unidos

References

1. Salem BE, Ma-Pham J. Understanding health needs and perspectives of middle-aged and older women experiencing homelessness. Public Health Nurs. 2015;32(6):634-644. doi: 10.1111/phn.12195
2. Sleath BL, Jackson E, Thomas KC, Galloway J, Dumain L, Thorpe J, Rollins A, Morrissey J. Literacy and perceived barriers to medication taking among homeless mothers and their children. Am J Health Syst Pharm. 2006;63(4):346-351.
3. Wilson M. Health-promoting behaviors of sheltered homeless women. Fam Community Health. 2005;28(1):51-63.
4. Young HN, Kanchanasuwan S, Cox ED, Moreno MM, Havican NS. Barriers to medication use in rural underserved patients with asthma. Res Social Adm Pharm. 2015;11(6):909-914. doi: 10.1016/j.sapharm.2014.12.004
5. Santschi V, Chiolero A, Colosimo AL, Platt RW, Taffé P, Burnier M, Burnand B, Paradis G. Improving blood pressure control through pharmacist interventions: a meta-analysis of randomized controlled trials. J Am Heart Assoc. 2014;3(2):e000718. doi: 10.1161/JAHA.113.000718
6. McAdam-Marx C, Dahal A, Jennings B, Singhal M, Gunning K. The effect of a diabetes collaborative care management program on clinical and economic outcomes in patients with type 2 diabetes. J Manag Care Spec Pharm. 2015;21(6):452-468.
7. Houle SK, Chatterley T, Tsuyuki RT. Multidisciplinary approaches to the management of high blood pressure. Curr Opin Cardiol. 2014;29(4):344-353. doi: 10.1097/HCO.0000000000000071
8. Zhong H, Ni XJ, Cui M, Liu XY. Evaluation of pharmacist care for patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. Int J Clin Pharm. 2014;36(6):1230-1240. doi: 10.1007/s11096-014-0024-9
9. Manigault KR, Lewis KA. Pharmacists role in cholesterol management: addressing challenges and barriers. J Pharm Pract. 2015;28(1):35-43. doi: 10.1177/0897190014562384
10. W Hutchison R Jr. Treating diabetes in underserved populations using an interprofessional care team. J Interprof Care. 2014;28(6):568-569. doi: 10.3109/13561820.2014.917408
11. Chung N, Rascati K, Lopez D, Jokerst J, Garza A. Impact of a clinical pharmacy program on changes in hemoglobin A1c, diabetes-related hospitalizations, and diabetes-related emergency department visits for patients with diabetes in an underserved population. J Manag Care Spec Pharm. 2014;20(9):914-919.
12. Connor SE, Snyder ME, Snyder ZJ, Pater Steinmetz K. Provision of clinical pharmacy services in two safety net provider settings. Pharm Pract (Granada). 2009 Apr;7(2):94-99.
13. Gatewood SB, Moczygemba LR, Alexander AJ, Osborn RD, Reynolds-Cane DL, Matzke GR, Goode JV. Development and Implementation of an Academic-Community Partnershipto Enhance Care among Homeless Persons. Inov Pharm. 2011;2(1):1-7.
14. Rustad C, Smith C. Nutrition knowledge and associated behavior changes in a holistic, short-term nutrition education intervention with low-income women. J Nutr Educ Behav. 2013;45(6):490-498. doi: 10.1016/j.jneb.2013.06.009