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Analgesic drug delivery through patches – a pre and post-interventional study among pharmacy students

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ABSTRACT

To assess the pre interventional knowledge regarding analgesic patch among M. Pharmacy 2nd year students A pre experimental research design one group pre-test and post-test design was used for the study. In pre-test 48(80%) had average knowledge, 12 (20%) had poor knowledge and none (0%) had good knowledge. The mean knowledge score obtained by the subjects were 13.4 and in post-test 36 (60%) had good knowledge, 21 (35%) had average knowledge and only 3 (5%) had poor knowledge. The mean knowledge score obtained 20.97. Paired "t" Test was done to find out the difference between the mean pre-test and post-test knowledge score and statistically it was highly significant 2.88. There was highly significant association between the post-test knowledge score and the selected socio demographic variables like age, gender, religion, any family member working in health care system, source of information, previous knowledge regarding analgesic patch. The study concluded that significance of difference was found between pretest & post-test knowledge score regarding analgesic patch. Students gain knowledge after the intervention and the study is statistically significant, but it needs more pharmacy practice and supervision to improve the quality of care.

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Introduction

The concept of transdermal drug delivery systems, now commonly referred to as patches, represents a non-invasive method of administering medications through the skin's surface (Jeong et al., 2021). The therapeutic applications of transdermal patches have expanded to include hormone replacement, pain management, and relief of chest pain associated with heart conditions, smoking cessation, and neurological disorders (Mathews & Roy, 2016). They offer several advantages over oral and injection methods, including improved biocompatibility, flexibility in drug administration through patch removal, painless application, extended wear duration (up to one week), enhanced patient compliance due to non-invasiveness and simplicity, and better control over drug delivery, resulting in reduced fluctuations in drug concentration compared to oral administration. However, this drug delivery system has not completely achieved its potential due to a few limitations (Wong et al., 2023).

Fentanyl is a narcotic analgesic recommended for use in the management of unremitting pain not controlled by morphine or other opiate/opioid drugs. The danger inherent to fentanyl is its potency (greater than 50–100 times that of morphine) and rapidity of action, causing respiratory depression within minutes of administration (Pain Management, 2019). Advisories have been issued on a state and national level to health care providers and through manufacturers' package inserts for patients. A drug that requires such extensive warnings—that if unheeded lead to death because of its narrow therapeutic/toxic window, should have strict criteria and limited outpatient use. Initial medical observation and documentation for determining tolerance might be required before issuing a prescription. There has been a rise in the popularity of this drug evidenced by increased deaths among drug abusers and more prescriptions written. In the year 2006, the Center for Forensic Sciences in Onondaga County had 8 cases where fentanyl was considered the cause of death, often with other drugs detected in therapeutic concentrations. This number was a marked increase from the 1 to 2 cases occurring annually from 2002 to 2005 (National Drug Threat Assessment, 2019).

The use of transdermal system to delivery such drugs has been of tremendous potential. However, our initial survey suggested that many health care workers and pharmacy students still don't know about the analgesic patches and their uses, hence it was necessary to assess the knowledge regarding analgesic patch and to provide planned teaching program to them.

Material and Methods

A total of 60 students of 2nd year M.Pharmacy of any branch were selected from Pharmacy College in Jabalpur for testing the hypothesis of role do intervention in updating knowledge about transdermal analgesic delivery. The actual data period was collected from 23/11/22 to 30/11/23 after taking informed & written consent from study participants. Permission from respective research committees of the institute were obtained and the subjects were clearly informed about the objective of the study. Modified Imogene King's Goal Attainment Theory will be used for the present study (Figure 1).

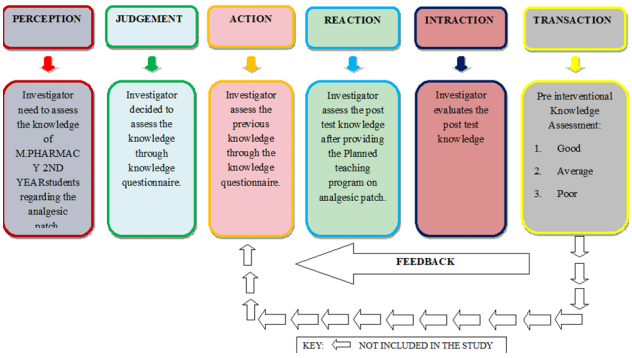

Figure 1. Conceptual Framework Based on Modified King's Goal Attainment Theory (Nurselabs, 2024)

The assessment of pre-test knowledge of transdermal analgesic was done using questionnaire comprising of demographic variables, any family member in healthcare, previous knowledge and source of information. The level of knowledge was scored as per the correct answers from 0-30 with 1 point per cor-

rect score and 0 per incorrect. A score was considered poor (0-10), average (11-20) and good (21-30). A planned teaching program on analgesic patch was used as the intervention for the study.

A pilot study of the planned teaching program was conduct for 30-35 minutes on the same day. Any doubts & questionnaire were cleared by the researcher, post test was conducted after 7th day. Data analysis was done using spearman-brown split half technique. The pilot study helped the investigator to visualized practical problems that could be while conducting main study.

Statistical Analysis

The descriptive statistical analysis of the data was done by frequency distribution and percentage distribution along with mean and standard deviation. Paired t-test was used to evaluate the effectiveness of planned teaching program on the knowledge of analgesic patch. A Chi-square test was used to find an association between post-test evaluation of regarding analgesic patch and their selected socio demographic variables (Evans & Rosenthal, 2023).

Results and Discussion

The pretest knowledge questionnaire included demographic status, religion, age, sex and previous knowledge on analgesic patches. The results obtained revealed that of the 60 samples students 63.34% are in age group of 20-21 year, 20% in age group of 21-22 and 15% in age group of 19-20 year and 1.66% are in age group of 23 & above. 98.34% students were female and 1.66 % male with 90% Hindu, 8.33% Muslim and 1.66% Christian. Majority of the students (68.37%) did not have any family member working in health care sector whereas 31.63 % had one or more family member in health care sector. The source of information of the majority (56.67%) students was internet while 21.67%, 15% and 6.66% said that the information was they had was through friends/ relative, television/radio and journal/ newspaper respectively. One-third of the questioned students had previous knowledge about patches (Figure 2).

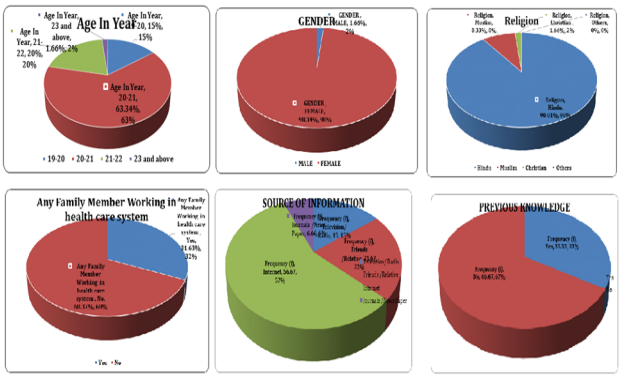

Figure 2. Distribution of various demographic parameters

Pre-test knowledge assessment showed that in the questioned population 80% had average knowledge, 20% had poor knowledge none 0% had good knowledge of analgesic patches.

Post intervention, the knowledge was reassessed on the 8th day and it was found that 60% had good knowledge, 35% had average knowledge, 5% had poor knowledge regarding analgesic patch. The mean Knowledge score of pre-tests of students was 13.4 with standard deviation 4.2, the mean knowledge Score of posttest is 20.97 and standard deviation is 3.59.

The efficacy of the teaching program was analyzed by paired t test and chi square test methods. The mean knowledge score of pre-test was 13.4 and post-test was 20.97 with a mean difference of is 7.5 with standard deviation (15.30) SED (2.60) and Calculated ('t') value is 2.88 more than tabulated value (p = 1.18) at of p>0.05 level of significance. Hence significance difference is found between knowledge score in pre and post-test suggesting effectiveness of the intervention. The association demographic variables with knowledge score was analyzed by Chi square test. The calculated chi-square value for age was 51.26 which is higher than the tabulated value 12.59 p > 0.05, level of significance which is statically highly significant, suggesting that the demographic variables age is associated with post-test knowledge score. Similarly the Chi Square for religion was obtained 126.12 which was higher than the tabulated value 12.59 p value > 0.05, suggesting that religion was highly associated with post-test knowledge score.

Conclusion

In the present work an attempt has been made to discuss the knowledge of analgesic transdermal patches as delivery system in M. Pharmacy students of Jabalpur region and the effect of interventional study on the same knowledge. The effectiveness of planned teaching programwas assessed by using paired 't' test, the significant difference in pre and post-test knowledge score shows that the intervention was efficiency their quest to new knowledge encourage the researchers throughout the study the constant help of guide and co guide provided a positive reinforcement for the successful completion of study.

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