Impact of Planned Teaching Program on Knowledge Regarding Preventive Aspects of Helicobacter Pylori Infection and its Associated Factors among Patients Admitted in Tertiary Care Hospital, Gangtok

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Abstract: *Background: Helicobacter pylori infection is a major contributor to gastritis, peptic ulcer, gastric ulcer and cancer worldwide. Despite its high burden, awareness of preventive strategies remains low. This study assessed the effectiveness of Planned Teaching Program in enhancing hospitalized patients' knowledge regarding Helicobacter pylori infection prevention and explored associated demographic and risk factors. Methods: A one-group pre-test–post-test design was employed in this quasi-experimental study conducted among 179 patients admitted in a tertiary care hospital in Gangtok. Participants were selected through purposive sampling. Data was collected using a self-structured tool. The Planned Teaching Program included a 30-minute interactive session using lectures, videos, and pamphlets. Post-tests were administered five days after the intervention. Analysis of data was done using descriptive statistics, paired t-tests, Pearson correlation, and chi-square tests. Results: Pre-test results showed 39.1% of participants had inadequate knowledge, while 60.9% had moderate knowledge. Post-intervention, 79.3% demonstrated adequate knowledge (p = 0.001). The mean knowledge score increased from 8.16 ± 2.13 (pre-test) to 15.88 ± 1.77 (post-test), which was statistically significant (p < 0.05). No significant correlations were found between knowledge scores and identified risk factors; however, a significant association was found between pre-test knowledge and number of children (p < 0.05). Conclusion: The Planned Teaching Program was effective in significantly improving patients' knowledge of Helicobacter pylori infection prevention. Incorporating structured educational interventions into routine clinical practice can enhance patient awareness and potentially reduce infection risks.*

Keywords: Plan teaching program, knowledge, prevention, Helicobacter pylori

1. Introduction

Helicobacter pylori, a spiral-shaped, gram-negative bacterium that colonizes the gastric mucosa survives the harsh acidic environment of the stomach by producing urease, an enzyme that neutralizes gastric acid, and escapes the immune system by attaching into the mucosal lining (1). Although many individuals remain asymptomatic, Helicobacter pylori infection is a well-established cause of chronic gastritis, peptic ulcers, mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma (2,3).

Globally, the infection poses a significant public health challenge. According to the World Health Organization, in 2020, Helicobacter pylori contributed to approximately 1.09 million cases of stomach cancer and 769,000 related deaths (4). A meta-analysis by Li Y et al. reported a global prevalence of 43.7% in adults, with Southeast Asia showing 46.7% prevalence (5). In India, infection rates vary across regions, with a national adult prevalence of 59.5% and a high of 80% in children. The Northeast region, including Sikkim, reported a 27% infection rate among patients undergoing upper GI endoscopy (6-8).

Despite its high prevalence, public awareness about Helicobacter pylori infection and its potential health risks remains low. Research highlights that socio-demographic variables such as education, hygiene, income, and source of drinking water influence infection risk (9-11). Studies in Jordan and other regions have shown that individuals with medical backgrounds or prior exposure to the infection possess better knowledge, highlighting the importance of targeted educational interventions (12,13).

In India, few studies have assessed public knowledge or evaluated interventions to improve awareness about Helicobacter pylori. The Northeast region, including Sikkim, lacks data on public education regarding this infection, despite moderate to high prevalence (6). In light of these findings, this study investigated the impact of a Planned Teaching Program in enhancing patients' knowledge regarding the preventive aspects of Helicobacter pylori infection and its associated factors in a tertiary care hospital in Gangtok.

Volume 15 Issue 3, March 2026
Fully Refereed | Open Access | Double Blind Peer Reviewed Journal
www.ijsr.net

Paper ID: SR26228230824   DOI: https://dx.doi.org/10.21275/SR26228230824   62

2. Methods

Study Design, Sample and Population
A quasi-experimental study utilizing one-group pre-test post-test design was undertaken at Central Referral Hospital (CRH), Gangtok, a tertiary care hospital among patients admitted to the Medical, Surgical, and Orthopaedic wards.

The study utilized a purposive sampling technique. The sample size was calculated using a standard formula. Based on an 88% expected outcome prevalence and 5% margin of error and accounting for a 10% non-response rate, 179 patients were enrolled. Inclusion criteria required patients above 18 years of age, admitted for at least six days, and able to communicate in Nepali, Hindi, or English. Patients unwilling to participate, those with severe cognitive impairment and critically ill patients were excluded.

Educational Intervention
A Planned Teaching Program was developed and implemented t improve patient's knowledge regarding Helicobacter pylori infection. The 30 minutes session was conducted in small groups of 6-8 participants. The content covered definition, modes of transmission, risk factors, signs and symptoms, diagnostic methods, treatment, prevention, complications and self-care practices. Teaching was delivered through lectures, group discussions, and visual aids such as PowerPoint presentations, charts, pamphlets and educational videos. The session was designed based on expert input and pilot testing, using interactive strategies. Evaluation was conducted through a post- test administered five days after the intervention to assess knowledge improvement.

Data Collection Tools
Data was collected using a self-structured and interview based tool which was divided into three sections:

Section I: **Demographic variables**- Included 12 items to gather baseline information such as age, gender, religion, education, marital status, number of children, type of family, household size, occupation, income, location of residence and primary source of drinking water.

Section II: **Structured Knowledge Questionnaire**- A 20-item multiple choice questionnaire was developed to assess participant's knowledge on Helicobacter pylori infection. The content area covered were definition, transmission, signs and symptoms, diagnosis, treatment, prevention, complications and self-care practices. Each correct response equated to 1 mark. Scores were interpreted as: 1–7: Inadequate knowledge, 8–14: Moderate knowledge and 15–20: Adequate knowledge.

Section III: **Associated Factors Rating Scale**- A 15 items 5-point Likert scale was designed to identify risk factors associated with Helicobacter pylori infection. Items were categorized under health behaviors and lifestyle, medical history and current condition, and access to healthcare and information sources. Scores ranged from 15 to 75, with interpretation as follows: 0-25: High risk, 26-50: Moderate risk and 51-75: Low risk.

Tool Validation and Reliability
Content validity was established by a panel of seven experts from Medicine, Microbiology, Gastroenterology, Community Medicine, and Nursing. Revisions were made based on expert feedback.

Reliability was ensured through Split-half method (Knowledge questionnaire: r = 0.83) and Inter-rater reliability (Demographics and rating scale: r = 1)

Data Collection Procedure
After obtaining ethical clearance and institutional permission, data were collected in two phases:

Phase I (Pre-test): Administration of the self-structured tool- demographic variables, knowledge questionnaire, and associated factors scale.

Intervention: A 30-minute Planned Teaching Program was conducted for small groups (6–8 participants).

Phase II (Post-test): Reassessment after 5 days using the same tools.

Informed written consent was obtained from all participants. Confidentiality was maintained.

Data Analysis
Data coding and analysis were performed using descriptive and inferential statistics in Statistical Package for Social Sciences (SPSS) version 22:

Descriptive: Frequency, percentage, mean, and standard deviation.
Inferential: Paired t-test (pre-post comparison), Pearson correlation (knowledge vs. associated factors), and Chi-square/Fisher's exact test (association with demographic variables). A significance level of $p < 0.05$ was used.

3. Results

Demographic Characteristics
The study involved a total of 179 patients. As presented in Table 1, most were male (57%), with the mean age of 49.99 ± 18.82 years. Most participants were Hindu (54.2%) and had completed high school education (39.7%). Nearly half of the participants were single (49.2%), and 57% reported having no children. More than half resided in nuclear families (52%). Professionals constituted the largest occupational group (20.1%), and the most common monthly income bracket was ₹31,978- ₹53,360 (27.4%). Slightly more participants lived in rural areas (51.4%) than urban areas (48.6%). Tap water was the predominant source of drinking water (38.5%).

Baseline Knowledge and Associated Factors
At baseline, 39.1% of participants demonstrated inadequate knowledge regarding the preventive aspects of Helicobacter pylori infection, while 60.9% had moderate knowledge; none demonstrated adequate knowledge. The mean pre-test knowledge score was 8.16 (SD = 2.13). Regarding associated factors, 83.8% of participants had a moderate level of awareness, while 16.2% had a low-level awareness. The mean pre-test score for associated factors was 44.51 (SD = 8.56).

Post-Intervention Knowledge and Associated Factors

Following the Planned Teaching Program, there was a significant improvement in knowledge levels. 79.3% of participants achieved adequate knowledge, 20.7% had moderate knowledge, and none remained in the inadequate category. The mean post-test knowledge score increased to 15.88 (SD = 1.77). Similarly, associated factor awareness improved, with the mean score rising to 47.79 (SD = 9.06); 77.7% of participants were at a moderate level and 22.3% at a low-level post-intervention.

Effectiveness of the Planned Teaching Program

Paired t-test analysis was done to assess the effectiveness of the educational intervention. There was statistically significant improvements in both knowledge (mean difference = 7.72, t = 38.52, p < 0.001) and associated factor scores (mean difference = 3.26, t = 5.21, p < 0.001) after the intervention was noted. The findings confirmed the effectiveness of Planned Teaching Program in improving both knowledge and awareness of contributing factors.

Correlation between Knowledge and Associated Factors

Pre and post intervention results showed a weak, non-significant positive correlation between knowledge and associated factor scores (pre-test: r = 0.067, p = 0.370; post-test: r = 0.087, p = 0.246).

Association between Demographic Variables and Knowledge

The Chi-square/Fisher's exact test analysis showed a significant association between the number of children and pre-test knowledge levels (Fisher's exact = 8.099, p = 0.035). Other demographic variables, including age, gender, religion, education, marital status, family type, household size, occupation, income, residence, and water source, showed no significant association (p > 0.05).

4. Discussion

Baseline knowledge and associated factors

The baseline findings of the study revealed that most patients had limited knowledge among participants, with a mean pre-test knowledge score of 8.16 (±2.13), and the mean pre-test score for associated factors of 44.51 (±8.56). This finding echoes studies conducted by Alaridah et al. in Jordan, where 68.7% showed insufficient awareness and Driscoll et al., who reported poor public familiarity with transmission routes and complications in various global populations. (13,14)

Effectiveness of a Planned Teaching Program

Post-intervention demonstrated statistically significant improvement in patient knowledge (mean=15.88 ± 1.77) and awareness of associated factors (mean=47.78 ± 9.04), indicating the effectiveness of the teaching program (p < 0.001). These findings are consistent with the study of Hafiz TA et al. at King Saud University where knowledge level improved significantly (55.6%) after educational interventions. Similarly, a meta-analysis by Zha et al. (2022) highlighted the positive impact of Enhanced Patient Education on eradication rates (RR = 1.16, 95%CI: 1.04–1.29, p = 0.006) and treatment compliance (RR = 1.48, 95%CI: 1.14–1.93, p = 0.003). (15,16)

Correlation between knowledge and associated factors

Although a weak positive correlation was observed between knowledge scores and associated factors (pre-test r = 0.067, p = 0.370; post-test r = 0.087, p = 0.246), these correlations were statistically non-significant. These finding differs from studies by Wang et al. and Liu et. al., which found a significant associations between awareness levels and preventive behaviors, indicating that other factors may mediate the link between knowledge and practice. (17,18)

Association between demographic variables and knowledge

Among the demographic variables examined, only the 'number of children' was significantly associated with pre-test knowledge (p = 0.035), while all other variables showed no significant associations (p > 0.05). This contrasts with findings from Alaridah et al., where educational level and medical background were significantly associated with higher knowledge scores (OR = 2.936; 95% CI: 1.718–5.018; p < 0.001). (13)

5. Limitations

The findings of the study are limited by its single-centre design at Central Referral Hospital, Gangtok, which may affect the generalizability of the results. Including multiple hospitals across different regions would improve the external validity. The use of convenience sampling may have introduced selection bias, reducing the representativeness of the study population. The absence of long-term follow-up limits the ability to assess the sustainability of knowledge gained through the intervention. The focus on a limited set of associated factors may have overlooked other relevant variables that influence knowledge and preventive behaviours related to Helicobacter pylori infection.

6. Conclusion

The Planned Teaching Program proved to be highly effective in improving knowledge regarding the preventive aspects and associated factors of Helicobacter pylori infection among patients in a tertiary care hospital, as evidenced by this study. The intervention resulted in a substantial increase in the proportion of participants with adequate knowledge. However, the improvement in knowledge did not directly translate into significant changes in awareness of associated risk factors, suggesting that additional strategies may be required to address behavioural and environmental determinants.

The findings highlight the importance of integrating structured educational interventions into routine patient care to enhance infection prevention efforts. The significant association between number of children and baseline knowledge suggests that caregiving responsibilities may influence awareness and should be considered in future educational initiatives.

Further research is recommended to assess the long-term retention of knowledge, evaluate changes in preventive behaviours, and explore the impact of broader interventions on Helicobacter pylori infection risk.

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