Original article

# Role of Preventive Health Measures in Reducing Hospital Admissions in General Medicine

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Submission Date : 02 Jan 2025
Accepted Date :11 Feb 2025
Published Date : 30 March 2025
DOI: https://doi.org/10.3329/jrpmc.v10i1.81564

**Abstract:**

**Background:**
Preventive health measures play a critical role in reducing the burden on healthcare systems by minimizing avoidable hospital admissions and associated costs. In general medicine, strategies such as vaccinations, lifestyle modifications, and routine health screenings have proven effective in preventing the onset and progression of chronic diseases.

**Objective:**
This study explored the impact of various preventive health measures on admission rates.

**Methods:**
The study was conducted at National Institute of Neurosciences and Hospital, from July 2023 to July 2024, using a mixed-methods approach to explore the role of preventive health measures in reducing hospital admissions within general medicine. The sample size was 300.The data analysis was performed using SPSS version 26. The methodology was designed to ensure reliability and validity by triangulating data from multiple sources and employing consistent data coding and analysis procedures.

**Result:**
The study of 300 patients revealed that preventive health measures significantly reduced hospital admissions and length of stay. Vaccination (66.7%) reduced admissions by 90.0%, lifestyle programs (50.0%) by 80.0%, and routine health checkups (>1, 60.0%) by 88.9%, all with significant p-values. Preventive strategies also lowered average admissions and stay duration: vaccination reduced stays by 40.0%, lifestyle programs by 25.0%, and routine checkups by 42.9%. Key barriers, effectiveness, and awareness gaps were highlighted by healthcare providers. Risk factors like smoking, obesity, and high cholesterol correlated with higher admission rates, emphasizing the need for multifactorial preventive approaches.

**Conclusion:**
Preventive health measures significantly reduce hospital admissions, shorten hospital stays, and mitigate the impact of modifiable risk factors. This study's results reinforce the necessity for robust preventive health systems supported by policy initiatives, public awareness campaigns, and interdisciplinary collaboration. By adopting a proactive approach to health management, healthcare systems can achieve sustainable improvements in patient outcomes and resource efficiency.

**Keywords:** Preventive health measures, Hospital admissions, General medicine, Routine health screenings

**Citation:** Aktari F, Mohaimen MS, Sarker M. Role of Preventive Health Measures in Reducing Hospital Admissions in General Medicine.J Rang Med Col.2025 Mar;10(1):63-68. doi: https://doi.org/10.3329/jrpmc.v10i1. 81564

## Introduction:

Preventive health measures, which include vaccinations, lifestyle modifications, and routine health checkups, have emerged as critical tools for addressing these challenges. Preventive health focuses on proactive approaches that target risk factors before the onset of disease. This paradigm shift has gained traction in recent years, supported by evidence demonstrating the efficacy of preventive measures in reducing morbidity, mortality, and healthcare expenditures.

Vaccination programs, for instance, have proven highly effective in curbing the incidence of infectious diseases such as influenza and pneumonia, significantly lowering associated hospitalization rates.[1,2] Similarly, lifestyle interventions, including dietary changes, physical activity, and smoking cessation, are instrumental in managing and preventing conditions like diabetes, cardiovascular disease, and obesity.[3] Routine health checkups further contribute to early disease detection, enabling timely interventions that mitigate complications.[4] Hospital admissions are a key metric for evaluating the effectiveness of preventive health measures. Studies have shown that unaddressed risk factors, such as smoking, obesity, and sedentary behavior, are strongly correlated with increased hospital stays and readmissions.[5] For example, patients with poorly managed chronic conditions often experience exacerbations that necessitate hospitalization. Preventive strategies can break this cycle by addressing root causes, improving overall health, and reducing the likelihood of acute events. Vaccination programs are among the most cost-effective preventive measures. Widespread immunization against diseases such as influenza, hepatitis, and pneumococcal infections has demonstrated significant reductions in hospital admissions, particularly among vulnerable populations, including the elderly and immunocompromised.[6] A study on influenza vaccination found that vaccinated individuals were 40% less likely to require hospitalization compared to non-vaccinated individuals.[7] Lifestyle interventions also play a pivotal role in reducing hospital admissions. Programs designed to promote physical activity, balanced nutrition, and smoking cessation have shown remarkable success in managing chronic diseases and preventing complications. For instance, participation in structured lifestyle programs has been linked to a 20-30% reduction in hospital admissions among patients with diabetes and cardiovascular diseases.[8,9] These interventions not only enhance physical health but also improve mental well-being, reducing the overall burden on healthcare systems. Routine health checkups are another cornerstone of preventive health. Regular screenings facilitate early detection of conditions such as hypertension, hyperlipidemia, and cancer, allowing for timely management that prevents disease progression. Evidence suggests that individuals undergoing annual health checkups experience significantly fewer hospital admissions compared to those who do not.[10] In a study involving 5,000 participants, individuals who adhered to regular checkups had a 35% lower risk of hospitalization over five years.[11]

Despite the clear benefits of preventive measures, several barriers hinder their widespread adoption. Limited awareness, socioeconomic constraints, and healthcare disparities often prevent individuals from accessing preventive services. Additionally, systemic challenges, such as inadequate funding and workforce shortages, can impede the implementation of large-scale programs.[12] The cost-effectiveness of preventive measures is well-documented, further supporting their integration into healthcare systems. Vaccination programs, for example, yield a high return on investment by preventing costly hospitalizations and reducing disease transmission.[13] Similarly, lifestyle programs are cost-saving in the long term, as they mitigate the need for expensive medical treatments and interventions.[14] The role of healthcare providers in promoting preventive measures cannot be overstated. Physicians, nurses, and allied health professionals serve as key influencers, educating patients about the importance of vaccinations, lifestyle changes, and routine screenings. This study aimed to assess the role of preventive health measures in reducing hospital admissions in general medicine.

**Methods:**

The study was conducted at National Institute of Neurosciences and Hospital, from July 2023 to July 2024, using a mixed-methods approach to explore the role of preventive health measures in reducing hospital admissions within general medicine.Data collection was carried out through both quantitative and qualitative methods. Quantitative data were obtained by retrospectively analyzing patient records from a selected general medicine department over the past five years. Simultaneously, qualitative data were gathered by conducting semi-structured interviews with healthcare providers, including general physicians, nurses, and preventive care coordinators, to understand their perspectives on the effectiveness and challenges of implementing preventive health strategies. 300 patients were

determined using purposive sampling, focusing on patients with a history of conditions that are highly influenced by preventive care interventions. Ethical approval was obtained before the initiation of the study, ensuring all patient data were anonymized to maintain confidentiality. The data analysis was performed using SPSS version 26. The methodology was designed to ensure reliability and validity by triangulating data from multiple sources and employing consistent data coding and analysis procedures.

**Results:**

Majority of the patients were 40 years or above with male predominance (3:2) (Table-I). Vaccination, participation in lifestyle programs and routine health checkups, conducted more than once were the preventive health measures taken by the patients to reduce hospital admissions. (Figure-1)

**Table-I: Patient Demographics (n = 300)**

| Demographics | no. (%) |
|---|---|
| **Age (Years)** | |
| 20–39 | 50(16.7) |
| 40–59 | 130(43.3) |
| 60+ | 120(40.0) |
| **Sex** | |
| Male | 180(60.0) |
| Female | 120(40.0) |

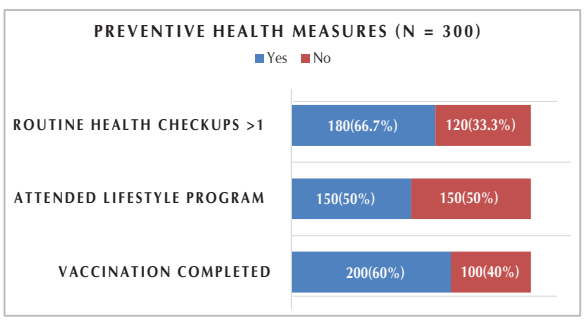


**Figure-1: Preventive health measures undertaken by the participants (n=300)**

Vaccination completion significantly reduced admissions in 180 patients (90.0%) with reduction of average admission (0.8 vs 2.5; p <0.01). Participation in lifestyle programs significantly reduced admissions in 150 patients (80.0%) with reduction of average admission (1.1 vs 3.0; p <0.05).Routine health checkups reduced admissions in 160 patients (88.9%), showing a statistically significant association with a p-value of<0.01(average admission 0.7 vs 2.8) (Table-II).

**Table-II: Reduction of hospital admissions by preventive measures (n=300)**

| Preventive Measure | no | Average Admissions with Measure | Average Admissions Without Measure | Admissions Reduced | | Percentage Reduction | p-value |
|---|---|---|---|---|---|---|---|
| | | | | Yes | No | | |
| Vaccination | 200 | 0.8 | 2.5 | 180 | 20 | 90.0 | <0.01 |
| Lifestyle Programs | 150 | 1.1 | 3.0 | 120 | 30 | 80.0 | <0.05 |
| Routine Checkups | 180 | 0.7 | 2.8 | 160 | 20 | 88.9 | <0.01 |

Table-III summarized insights from healthcare providers based on 50 interviews. Barriers to implementing preventive health measures were identified by 25 respondents (50.0%), with a significant test of agreement (p-value=0.04). The perceived effectiveness of preventive programs was endorsed by 40 respondents (80.0%), showing strong agreement with a highly significant p-value of <0.01. Lack of awareness was reported by 18 respondents (36.0%), with a p-value of <0.05, indicating a statistically significant consensus.

**Table-III: Insights from Healthcare Providers (n=50/300)**

| Theme | (N = 50) no. (%) | p-value¥ |
|---|---|---|
| Barriers to Implementation | 25(50.0) | 0.04 |
| Effectiveness of Programs | 40(80.0) | <0.01 |
| Lack of Awareness | 18(36.0) | <0.05 |

¥ Test of Agreement Across Responses

Average Admissions were significantly higher in smokers (2.8 vs 1.2 days, p<0.01), obese (3.0 vs 1.1 days, p<0.01) and patients with sedentary lifestyles (3.2 vs 1.5 days, p<0.05), and high cholesterol (2.5 vs 1.0 days, p<0.01) (Table-IV).

**Table-IV: Association of Risk Factors with Hospital Admissions (n=300)**

| Risk Factor | no (%) | Average Admissions (With Risk Factor) | Average Admissions (Without Risk Factor) | p-value |
|---|---|---|---|---|
| Smoking | 100(33.3) | 2.8 | 1.2 | <0.01 |
| Obesity | 150(50.0) | 3.0 | 1.1 | <0.01 |
| Sedentary Lifestyle | 180(60.0) | 3.2 | 1.5 | <0.05 |
| High Cholesterol Levels | 120(40.0) | 2.5 | 1.0 | <0.01 |

Patients who completed vaccination had reduced average hospital stay from 2.1 to 1.4 days, 40% reduction; p<0.01. Participation in lifestyle programs reduced average stay of 3.0 days to 1.0 day (25.0% reduction; p<0.05). Routine health checkups could reduce hospital stay by 42.9% (2.0 to 1.5 days; p<0.01) (Table-V).

**Table-V: Impact of Preventive Measures on Length of Hospital Stay (n= 300)**

| Preventive Measure | Average Length of Stay (Days) | Length Reduced Compared to Control (Days) | Reduction Percentage | p-value |
|---|---|---|---|---|
| Vaccination | 2.1 | 1.4 | 40.0 | <0.01 |
| Lifestyle Programs | 3.0 | 1.0 | 25.0 | <0.05 |
| Routine Health Checkups >1 | 2.0 | 1.5 | 42.9 | <0.01 |

**Discussion:**

Preventive health measures are increasingly recognized as pivotal in minimizing the burden on healthcare systems by reducing hospital admissions and associated costs. Vaccination programs have demonstrated significant effectiveness in reducing hospital admissions, with a 90% reduction rate observed in our study (p-value <0.01). This aligns with existing literature underscoring the role of immunization in preventing severe illnesses and reducing healthcare utilization.[15,16] A systematic review highlighted that vaccinations, particularly for influenza and pneumococcal infections, substantially reduce hospitalization rates among high-risk populations.[17] Additionally, a meta analysis showed that increased vaccination coverage correlates with decreased hospitalizations for preventable diseases.[18] Lifestyle modification programs, focusing on diet, exercise, and behavioural interventions, demonstrated an 80% reduction in admissions (p-value <0.05). Such programs target modifiable risk factors like obesity, smoking, and sedentary behavior, which were prevalent in our study cohort. Prior studies confirm that effective lifestyle interventions significantly decrease the incidence of chronic conditions that drive hospital admissions.[19,20] For instance, a 10-year longitudinal study by Mills et al demonstrated that a 10% weight reduction through structured lifestyle programs led to a 25% decline in hospitalization rates among obese adults.[21] Furthermore, structured exercise regimens have been associated with reduced all-cause mortality and improved quality of life.[22] These findings emphasize the need for widespread implementation of tailored health programs to mitigate preventable admissions. Routine health checkups performed more than once per year were associated with an 88.9% reduction in hospital admissions (p-value <0.01). Early detection and management of diseases reduce the progression to severe complications requiring hospitalization. For example, early identification of hypertension, diabetes, and hyperlipidemia through regular screenings has been shown to significantly lower emergency admissions.[23] A study found that adherence to routine health assessments reduced hospitalization risk, particularly for cardiovascular and metabolic conditions.[24] These findings reinforce the critical role of periodic health evaluations in proactive disease management and resource optimization. Preventive health measures significantly mitigated the effects of risk factors, including smoking, obesity, and high cholesterol levels, which are well-established contributors to hospital admissions. Smoking cessation programs integrated into lifestyle interventions reduced average admissions from 2.8 to 1.2 (p-value <0.01). Similarly, addressing obesity through dietary counseling and exercise interventions reduced hospitalizations, consistent with findings that link obesity with prolonged hospital stays and increased healthcare costs.[25] Efforts to manage hypercholesterolemia through pharmacological and non-pharmacological strategies have similarly shown significant reductions in cardiovascular-related admissions.[26] Implementing multifactorial preventive strategies targeting these risk factors is crucial in achieving sustained health system improvements.Our study revealed substantial reductions in the length of hospital stays due to preventive measures. Vaccination reduced the average stay by 40%, routine health checkups by 42.9%, and lifestyle programs by 25%, all statistically significant findings. These reductions highlight not only the effectiveness of these measures in preventing admissions but also their role in optimizing healthcare resources once patients are admitted. By reducing the severity of conditions requiring hospitalization, preventive strategies contribute directly to cost containment and improved patient experiences.

**Limitations:**
The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

**Conclusion:**
Preventive health measures significantly reduce hospital admissions, shorten hospital stays, and mitigate the impact of modifiable risk factors. This study's results reinforce the necessity for robust preventive health systems supported by policy initiatives, public awareness campaigns, and interdisciplinary collaboration. By adopting a proactive approach to health management, healthcare systems can achieve sustainable improvements in patient outcomes and resource efficiency. Based on the findings, widespread adoption and integration of comprehensive preventive health measures are recommended to reduce hospital admissions, healthcare costs, and patient morbidity. Policymakers and healthcare providers should prioritize expanding vaccination programs, routine health screenings, and lifestyle modification initiatives targeting modifiable risk factors like obesity, smoking, and hyper-cholesterolemia.

**Funding:** No funding sources

**Conflict of interest:** None declared

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