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The National Institute of Health and Family Welfare

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Food Safety Trends in India: A Geospatial Analysis

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Abstract

Food safety is the notion that food will not induce adverse effects when devoured according to its designated purpose. Unsafe food promotes a vicious circle of sickness and malnutrition. In compliance with the Food Safety Standard Act of 2006, the Food Safety and Standards Authority of India (FSSAI) was institutionalised in 2008 to regulate food regularity in India. FSSAI published its first State Food Safety Index (SFSI) in 2019 to assess the performance of states and union territories (UTs) concerning food safety. Its fifth report was produced in 2023. This study focuses primarily on food safety trends in Indian states and UTs during 2019-2023. The findings indicate that 61.11 per cent of states and UTs were at their peak performance in food safety in the 2019-20 SFSI. However, there has been an ongoing decline since the 2019-20 SFSI. 75 per cent of large states, 62.5 per cent of small states and 87.5 per cent of UTs performed lowest in 2022-23 SFSI. The results reveal that food safety is declining in 75 per cent of the states and UTs.

Key words: Food safety, FSS Act, FSSAI, SFSI.

Introduction

Sustainable Development Goal (SDG) 2, namely, ''End Hunger, achieve food security and improved nutrition and promote sustainable development[1].'' The rising living standards and consumer concerns about health and food hygiene contribute to a growing requirement for food safety worldwide. Accordingly, food safety rules have become strict throughout[2-4]. Food safety is the notion that the food will not induce adverse effects when devoured according to its designated purpose[5]. The primary duty for food safety is with those who produce, process, transport, store and market/trade the food, such as the farmers, slaughterhouse operators, fishermen, processors of food, wholesale and retail merchants, caterers, etc. The onus falls on them to guarantee that food that will be eventually ingested by man fulfils the highest feasible health standard[6].

Developing countries are paying more surveillance to food safety because of rising knowledge of its potential influence on public health, food security, and trade competitiveness[7]. Globally, Asia and sub-Saharan Africa have the highest frequency of food-borne diseases (FBDs), coupled with the highest rate of fatalities owing to FBDs and the most significant loss of disability-adjusted life years (DALYs)[8,9]. During the ten years stretching from 2009 to 2018, 2688 food-borne disease outbreaks, resulting in 153,745 illnesses and 572 fatalities, were reported to the Integrated Disease Surveillance Programme (IDSP)[10]. If food safety standards in India stay current, around 100 million yearly cases of food-borne diseases are assumed, which will increase to 150–177 million cases by 2030[10,11].

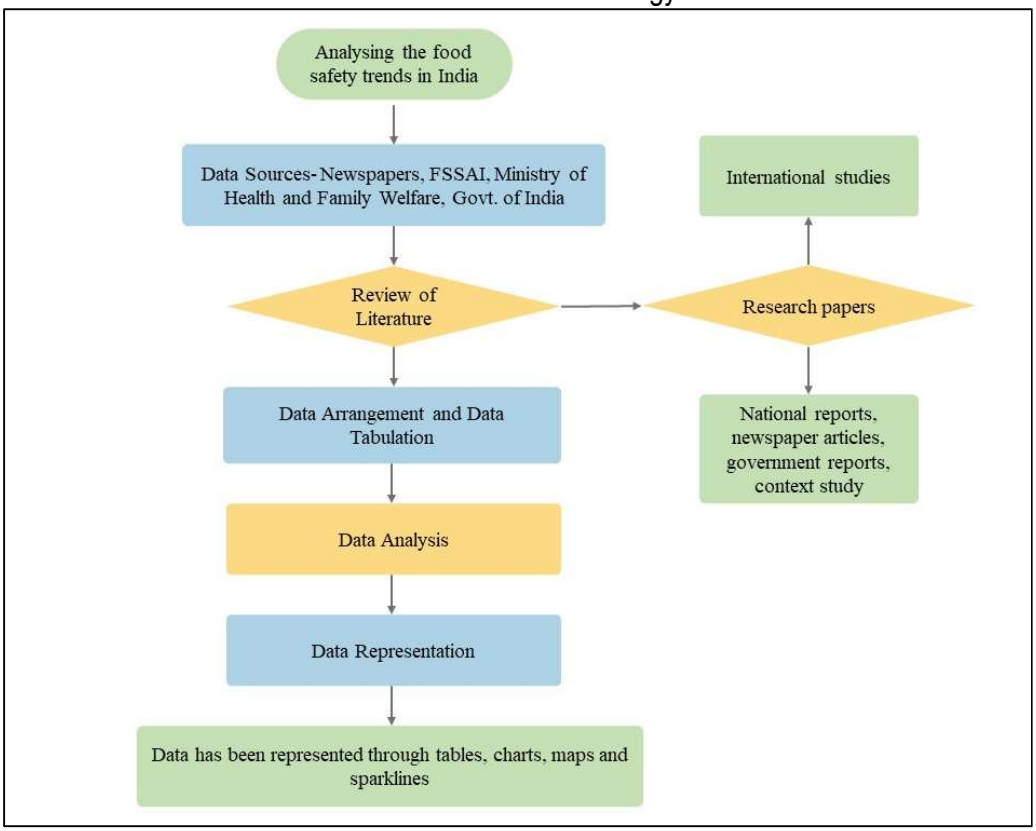
The Food Safety and Standards Act (FSS Act) of 2006 is a regulation in India that attempts to ensure the quality and assurance of human-made food products. It established the Food Safety and Standards Authority of India (FSSAI) as the regulatory agency responsible for creating standards, regulating the manufacture, storage, distribution, sale, and import of food products, and promoting food safety awareness. According to Section 16(2)(g), the FSSAI assesses the country's implementation and regulation of the FSS Act, 2006. FSSAI has taken initiatives to address food safety issues, such as developing tools for testing food adulterants, distributing mobile food testing vans, and launching consumer portals and mobile apps for easy access and complaint lodging[12]. "Food Safety" is an 'assurance that food is appropriate for human consumption according to its intended use' as per Section 3. (q) of the FSS Act 2006[12,13]. The FSS Act replaced a total of eight laws that were in effect before its enforcement:

i. The Prevention of Food Adulteration Act, 1954 (37 of 1954) under the health and family welfare ministry.
ii. The Fruit Products Order, 1955, under the Ministry of Food Processing Industries.
iii. The Meat Food Products Order, 1973, under the Ministry of Food Processing Industries.
iv. The Vegetable Oil Products (Control) Order, 1947, under the Ministry of Consumer Affairs, Food and Public Distribution.
v. The Edible Oils Packaging (Regulation) Order, 1998, under the Ministry of Consumer Affairs, Food and Public Distribution.
vi. The Solvent Extracted Oil, De-oiled Meal, and Edible Flour (Control) Order, 1967, under the ministry of consumer affairs, food and public distribution.
vii. The Milk and Milk Products Order, 1992, under the agriculture ministry.
viii. Any other order issued under the Essential Commodities Act, 1955 (10 of 1955) relating to food.

Methodology

The research methodology is a well-organized and purposeful approach to collecting data or information about a specific objective. Data have been collected, processed, analysed, and presented to achieve the goals outlined in this article. The current study is based on secondary data sources. The data was gathered from numerous newspapers and reports published by the FSSAI, the Ministry of Health and Family Welfare, and the government of India. MS Excel has been used to process the collected data, and any necessary modifications have been made for the data analysis of the final stage. Furthermore, the data was analysed in an orderly using an Excel sheet. The spark-line feature has been used to represent data and show the SFSI trend visually. The latest Arc GIS 10.8 software has been used to prepare maps. The tables, bar diagrams and maps illustrate the data.

Figure 1
Flow Chart of Methodology



Study Area

The study area includes the total 28 states and eight union territories (UTs) of India (6°4' N to 37°6' latitudes to 68°7'E to 97°25' E longitudes). India is the world's seventh-largest and second-populated country, with a population of 12108,54,977 (census, 2011). India has a total geographical area of 3.28 million km².

State Food Safety Index

FSSAI has created the SFSI to accomplish the mandate granted under the FSS Act, 2006 clause, to assess the execution of states and UTs concerning food safety. For better understanding, India is divided into states and union territories. States are also categorised into large and small states (Table 1). The index evaluates states' and UTs' performance based on six key parameters: i) Human Resources and Institutional Data, ii) Compliance, iii) Food Testing– Infrastructure and Surveillance, iv) Training and Capacity Building, v) Consumer Empowerment, vi) improvement in SFSI Rank (Figure 1). Utilising different combinations of quantitative and qualitative measures, this dynamic benchmarking model offers an unbiased and objective way to gauge food safety standards across all states/UTs. It is a valuable tool for measuring and comparing the food safety practices and initiatives taken by different states and UTs of the nation (www.fssai.gov.in). FSSAI has chosen to release the SFSI annually on June 7th, known as "World Food Safety Day."

Table 1

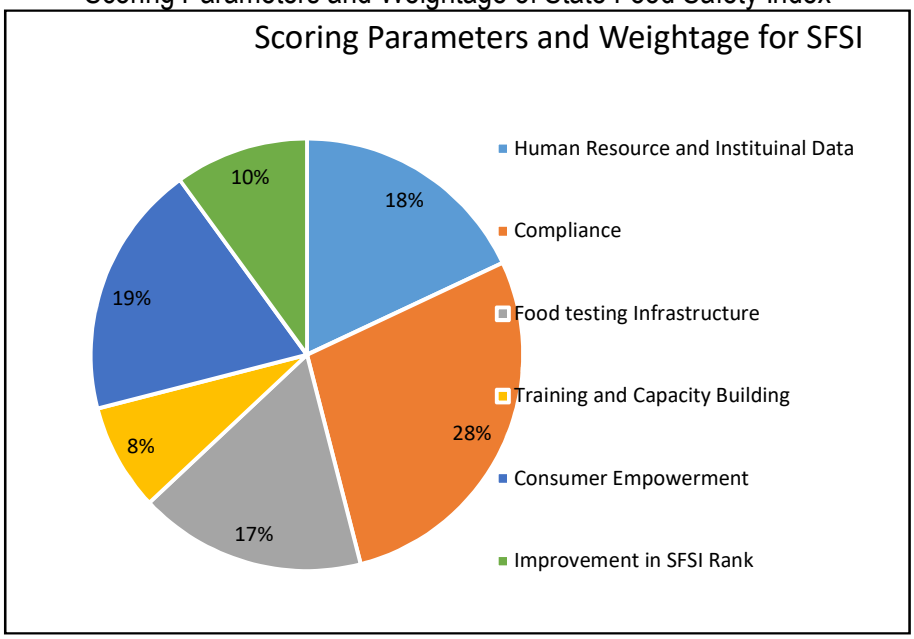
List of State and UTs

Large States	Andhra Pradesh, Assam, Bihar, Gujrat, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Odisha, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal
Small States	Goa, Manipur, Meghalaya, Tripura, Sikkim, Nagaland, Arunachal Pradesh and Mizoram
Union Territories	Jammu and Kashmir, Delhi, Chandigarh, Ladakh, Andaman and Nicobar, Dadra and Nagar Haveli and Lakshadweep

Source: State Food Safety Index Report, 2023

Figure 2

Scoring Parameters and Weightage of State Food Safety Index



Source: State Food Safety Index Report, 2023

The state/UT food safety commissioners are foremost responsible for ensuring and directing the standards/regulations that are followed. Additionally, since the Prevention of Food Adulteration (PFA) Act is the source of the state/UT's food safety regulations, each state's resources, including staffing levels in the food department and funding for that department, differ significantly from state to state. The FSS Act of 2006 gives authority to all states to provide permanent staff, a suitable budget, and resources for the act's implementation, even though the conditions in states and UTs are very different regarding food safety.

The FSSAI aims to foster a healthy spirit of competition among states/UTs to make safe and nourishing food accessible for human consumption across the country by developing a

standardised matrix around food safety. This index will help to understand how the overall and year-to-date performance compares to other states and the UTs. The SFSI will help the states/UTs identify and solve their areas of weakness. The SFSI 2022-23 takes into account the performance of the states and UTs on six key parameters. A new parameter improvement in the SFSI Rank is introduced. Before 2022-23, five parameters were employed to measure food safety.

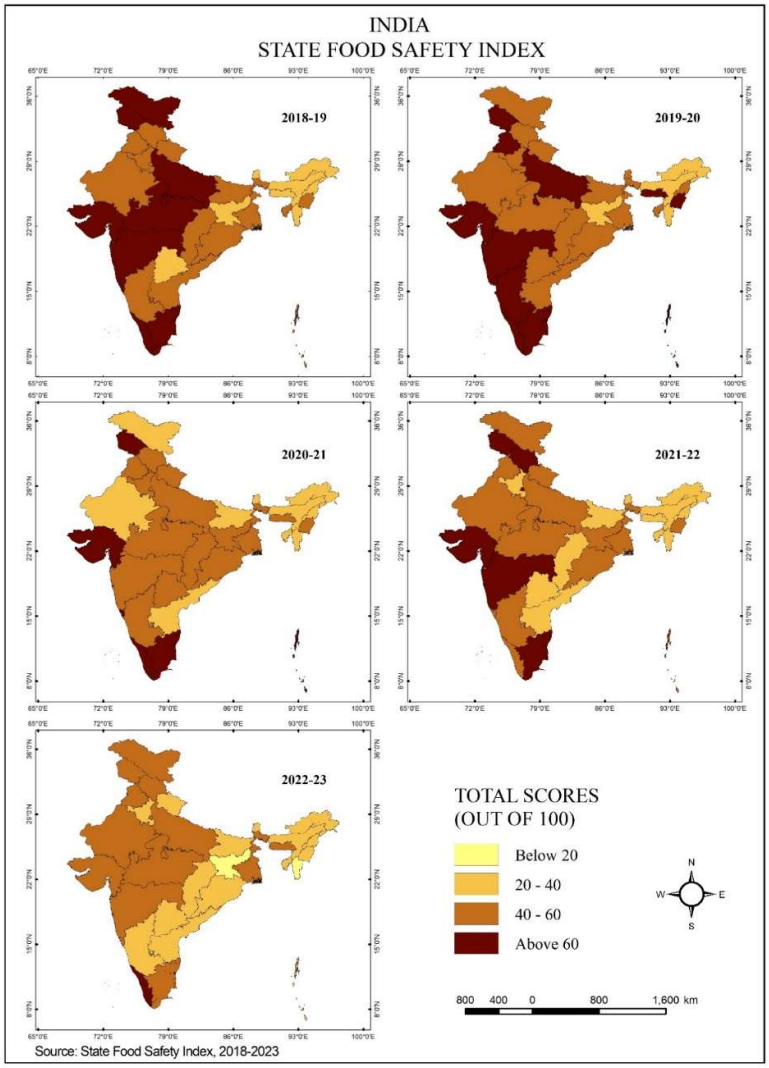
This study focuses entirely on the food safety trends of states/UTs in India. The SFSI data is analysed to determine which regions or states frequently perform well or poorly regarding food safety— identifying the factors causing these differences, such as infrastructure, regulatory enforcement, or public awareness.

Findings

Food Safety Trends in India

The spatial distribution of food safety across regions is depicted in Figure 3, with scores categorised into four groups: below 20, 20-40, 40-60, and above 60, aiding in the comprehension of food safety trends in India. Notable regional disparities exist in food safety standards across the states. In the 2018–19 SFSI, only ten states and UTs scored above 60, with no northeastern states among them. By the 2019-20 SFSI, the total number had increased to 14 states and UTs, including Meghalaya and Manipur from the northeast. Western coastal states performed well in the 2018-20 index due to solid consumer empowerment and adequate food testing infrastructure. However, in the 2020-21 SFSI, only seven states and UTs scored above 60 due to nationwide lockdowns amid the COVID-19 pandemic caused by the SARS-COV-2 virus. Subsequent assessment 2021-22 SFSI witnessed a further decline, with only six states surpassing the 60-point mark, with Tamil Nadu and Gujarat maintaining this status for four consecutive years. In the 2022-23 SFSI, Kerala was the sole state scoring above 60, indicating a continued decrease in food safety standards post-2019-20 SFSI.

Figure 3
State Food Safety Index, 2018-23



SFSI for the northeastern states still needs to improve, with none achieving a score of 60 except Meghalaya and Manipur in the SFSI 2020-21 period. In comparison, the performance of northeastern states lags significantly behind that of other states of India. Noteworthy, states such as Bihar, Jharkhand, West Bengal, Odisha, Chhattisgarh, Telangana, and Andhra Pradesh, while western states such as Gujarat, Karnataka, Maharashtra, Goa, and Kerala have consistently attained favourable index scores. These disparities underscore substantial regional differences in food safety standards across states and union territories.

The western coast states and UTs have demonstrated commendable performance in food safety. States with higher GDP exhibit stronger performance, attributed to robust consumer empowerment initiatives such as active participation in Eat Right India campaigns and well-developed food testing infrastructure.

Performance of Large States During 2018-23

Figure 4 reveals that 2018-19, SFSI, Maharashtra, Gujarat and Tamil Nadu were in the top three states. On the contrary, Jharkhand, Assam and Telangana were the least competitive states. During 2019-20 SFSI, Gujrat and Tamil Nadu rose first and second, respectively, while Maharashtra dropped to third. Jharkhand and Assam were ranked at the bottom in the same position, and Andhra Pradesh replaced Telangana. In 2020–21, SFSI, Gujarat, Kerala, and Tamil Nadu continued to hold the top three states. The state that performed most poorly was Bihar, followed by Andhra Pradesh and Assam. In the assessment year 2021-22, Tamil Nadu reclaimed the top position with an all-time highest score of 82, followed by Gujrat and Maharashtra. The poorest performer was Andhra Pradesh, followed by Bihar and Telangana. In the assessment year 2022-23, Kerala begs the top position for the first time, followed by Punjab and Tamil Nadu. Jharkhand is the mass diminutive performer, followed by Bihar and Assam.

Table 2

Performance of Large States

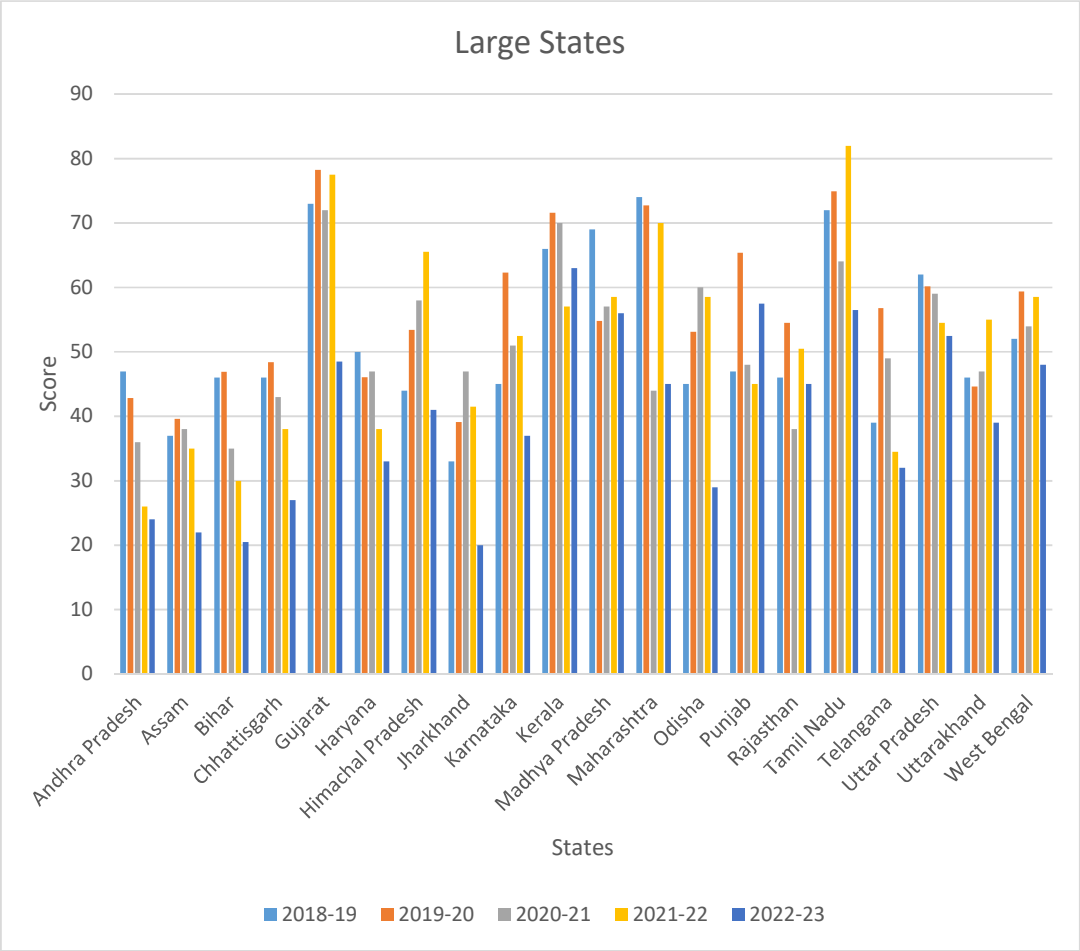
States/Year	2018-19	2019-20	2020-21	2021-22	2022-23	Sparkline
Andhra Pradesh	47	42.8	36	26	24	
Assam	37	39.6	38	35	22	
Bihar	46	46.9	35	30	20.5	
Chhattisgarh	46	48.4	43	38	27	
Gujarat	73	78.25	72	77.5	48.5	
Haryana	50	46.05	47	38	33	
Himachal Pradesh	44	53.4	58	65.5	41	
Jharkhand	33	39.15	47	41.5	20	
Karnataka	45	62.3	51	52.5	37	
Kerala	66	71.6	70	57	63	
Madhya Pradesh	69	54.8	57	58.5	56	
Maharashtra	74	72.75	44	70	45	
Odisha	45	53.15	60	58.5	29	
Punjab	47	65.35	48	45	57.5	
Rajasthan	46	54.5	38	50.5	45	
Tamil Nadu	72	74.9	64	82	56.5	
Telangana	39	56.8	49	34.5	32	
Uttar Pradesh	62	60.2	59	54.5	52.5	
Uttarakhand	46	44.65	47	55	39	
West Bengal	52	59.35	54	58.5	48	

Source: Reports of state food safety index

Kerala, Maharashtra, and Gujarat are the most significant states in the category of large states. These three states are in the top 5 spots in all five-year reports. Gujrat is the only state that scored more than 70 in every SFSI from 2018 to 2023, except 2022-23. Four states (Kerala, Madhya Pradesh, Tamil Nadu and Uttar Pradesh) scored more than 50 in each Index.

The spark line (Table 2) shows that Andra Pradesh, Bihar, Chhattisgarh, Haryana, and Uttar Pradesh are continuously declining in the SFSI. In 2022-23 SFSI, 75 per cent of the large states were at their minimum scores except for Kerala, Madhya Pradesh, Panjab, and Rajasthan.

Figure 4
Performance of Large States



Performance of Small States during 2018-'23

Figure 5 reveals that in the 2018-19 SFSI, Goa came in first among small states with a score of 75, followed by Manipur and Tripura. However, Arunachal Pradesh, Sikkim and Nagaland had the lowest performance. 2019–20, SFSI, Goa and Manipur restored their prior positions, and Meghalaya took Tripura's top spot. The state that performed lowest was Mizoram, followed by Arunachal Pradesh and Nagaland. Goa again led the list in 2020–21 SFSI, followed by Meghalaya and Manipur. While Mizoram, Tripura, and Arunachal Pradesh were in last place. In 2021–2022 SFSI, Goa topped the list for the fourth consecutive year, followed by Manipur and Sikkim. The state with the lowest performance was Arunachal Pradesh, followed by Mizoram and Nagaland. In 2022–2023 SFSI, Goa again came out on top among small states, followed by Manipur and Meghalaya. Mizoram had the lowest performance, followed by Arunachal Pradesh and Nagaland.

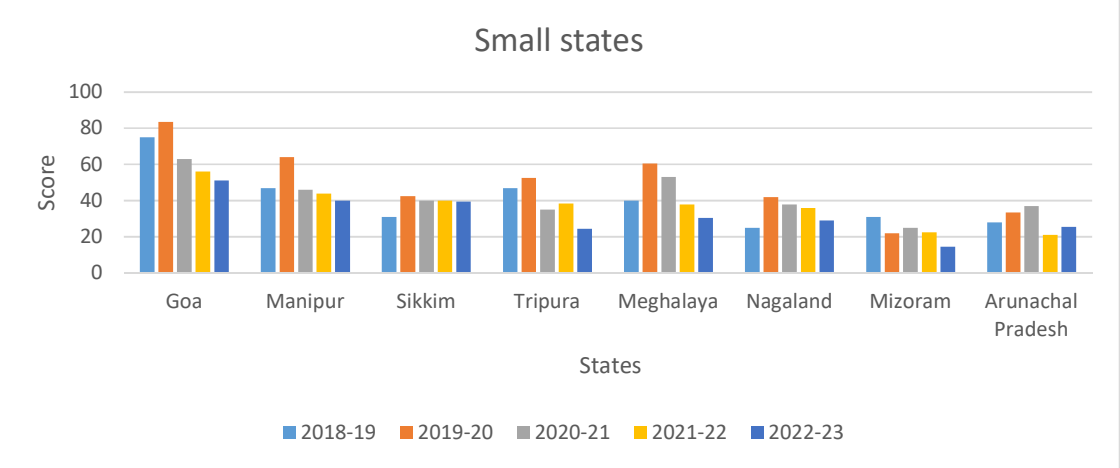
Table 3
Performance of Small States 2018-'23

States/Year	2018-19	2019-20	2020-21	2021-22	2022-23	Sparkline
Goa	75	83.5	63	56	51	
Manipur	47	64	46	44	40	
Meghalaya	40	60.5	53	38	30.5	
Tripura	47	52.5	35	38.5	24.5	
Sikkim	31	42.5	40	40	39.5	
Nagaland	25	42	38	36	29	
Arunachal Pradesh	28	33.5	37	21	25.5	
Mizoram	31	22	25	22.5	14.5	

Source: Reports of state food safety index

Goa is the leading state in the category of small states. The same trend is also seen in small states. Most states had their best scores in 2019-20 except Arunachal Pradesh and Mizoram. 62.5per cent of the small states have their minimum score in the 2022-23, except Arunachal Pradesh, Sikkim and Nagaland (Table 3). Sikkim is the only state that maintains the individual average score.

Figure 5
Performance of Small States During 2018-'23



Performance of Union Territories during 2018-23

Figure 6 shows that in the 2018–'19 SFSI, Jammu & Kashmir and Chandigarh shared the top position, followed by Delhi in the category of UTs. On the contrary, Lakshadweep, followed by Puducherry and Andaman and Nicobar, were the lowest performers in the UTs. In 2019-20 SFSI, Chandigarh again topped the UTs, followed by Delhi, Andaman, and Nicobar. In 2020–21, SFSI, Jammu and Kashmir topped the UTs, followed by Andaman & Nicobar and Delhi. Lakshadweep, Puducherry, and Ladakh were the lowest-performing UTs. 2021-22, SFSI Jammu and Kashmir regained their position, followed by Delhi and Chandigarh. Lakshadweep was still last, followed by Puducherry, Daman and Diu, Dadra and Nagar Haveli. Jammu & Kashmir again topped the list for the assessment year 2022–2023, followed by Delhi and Chandigarh. Jammu and Kashmir, Delhi, and Chandigarh have consistently exhibited exemplary performance.

There was a massive decline in the SFSI in 2022-23. The 2022–23 SFSI shows that 87.5 per cent of UTs were at their lowest score except for Ladakh (Table 4). Lakshadweep is the worst performer because it is a small island in the Arabian Sea with an approximate population of 65000, lacks a significant food infrastructure, and has no specific training program during the calculation year. Jammu and Kashmir are doing well due to their performance in training, capacity building, and consumer empowerment.

Table 4

Performance of UTs during 2018-'23

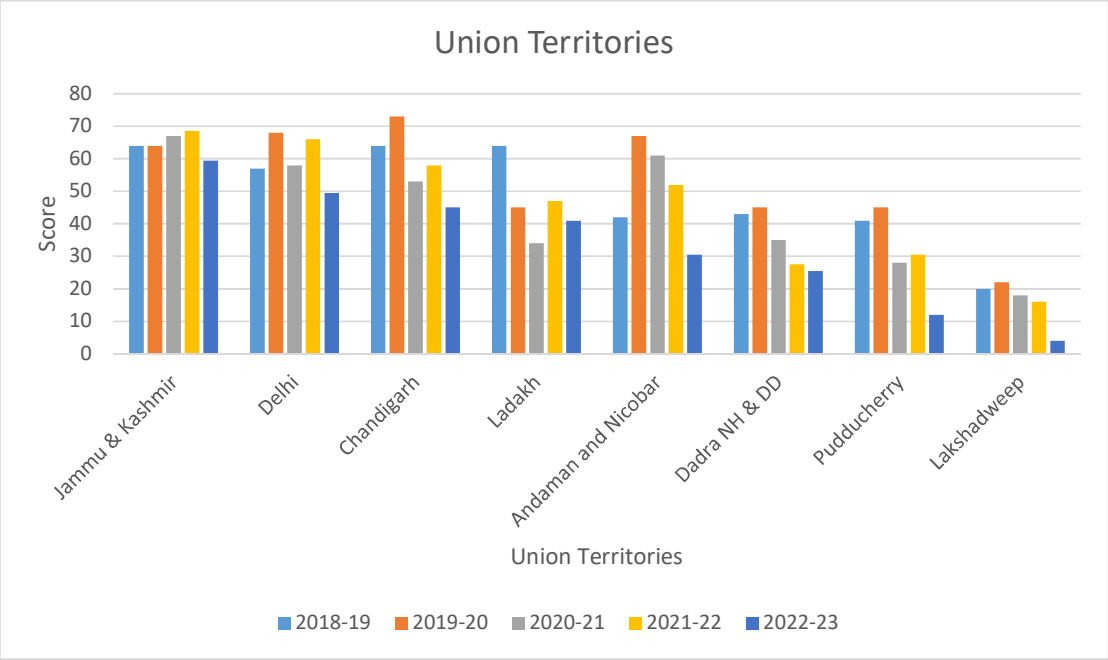
State/ Year	2018-19	2019-20	2020-21	2021-22	2022-23	Sparkline
Jammu & Kashmir	64	64	67	68.5	59.5	
Delhi	57	68	58	66	49.5	
Chandigarh	64	73	53	58	45	
Ladakh	64	45	34	47	41	
Andaman and Nicobar	42	67	61	52	30.5	
Dadra and Nagar Haveli	43	45	35	27.5	25.5	
Puducherry	41	45	28	30.5	12	
Lakshadweep	20	22	18	16	4	

Source: Reports of state food safety index

To ensure food safety compliance, several inspections of food facilities have been conducted in the Union Territory of Jammu and Kashmir, and numerous enforcement samples have been lifted. Additionally, customer complaints have been promptly and successfully resolved, assuring rapid disposal and effectively addressing customer concerns (SFSI, 2023)

Figure 6

Performance of Union Territories during 2018-'23



Conclusions and Recommendations

This paper analyses the trends in food safety across 28 states and 8 Union Territories (UTs) in India up to the year 2023. The states are categorised into 20 large states and eight small states. Six distinct parameters are utilised for computing the Food Safety Index (FSI). The results reveal that during the 2019-20 period, 50 per cent of large, 75 per cent of small, and 75 per cent of UTs exhibited peak performance in the SFSI. However, a constant decline has been monitored since then. According to the 2022-23 SFSI, 75 per cent of significant, 62.5 per cent of small, and 87.5 per cent of UTs demonstrated the lowest performance. Notably, the SFSI scores remained high from 2018 to 2022 due to the evaluation of only five indicators. However, in the 2022-23 assessment, adding a new parameter, Improvement in SFSI, resulted in a score decline. Fourteen out of 20 large states scored zero in this parameter, indicating a significant contributing factor to the overall decrease in the SFSI. Tamil Nadu and Gujarat stand out as continuously performing well, attributed to their focus on empowering human resources and institutional data.

Despite efforts, most states are witnessing a decrease in their SFSI scores. States with lower GDP must catch up in food safety compliance and consumer empowerment. For instance, despite high government initiatives, Rajasthan and Arunachal Pradesh exhibit lower SFSI scores due to inadequate consumer empowerment. Conversely, Tamil Nadu, Gujarat, Maharashtra, and Goa demonstrate high levels of consumer empowerment and government initiatives, resulting in commendable SFSI scores. Furthermore, a decline in food safety standards is observed across 90 per cent of large states, 87.5 per cent of small states, and all UTs until 2023.

This underscores the imperative for every state government representative to prioritise food safety measures to arrest the deteriorating trend. The paper underscores the significance of stringent food safety standards to mitigate adverse health consequences of food consumption. Additionally, it discusses the establishment of regulatory bodies such as the FSSAI and initiatives like the SFSI as pivotal steps towards regulating and evaluating food safety performance at both state and UT levels.

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Knowledge, Attitude and Practice on Patient Safety Measures among Health Care Workers in Public Health Care institutions of Jammu Division, J&K: A Cross-Sectional Study

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Abstract

Patient safety is a fundamental element of health care and is the freedom for a patient from unnecessary harm or potential harm associated with the provision of health care. Patient safety has been identified as a global priority area. It is one of the foremost challenge healthcare is dealing with. The Descriptive Cross-sectional study was conducted among the Health Care Workers (HCW) aiming to provide a detailed description of the current situation of the HCW regarding Patient Safety Measures (PSM) by assessing their knowledge, attitude and practices. Primary data were collected from a total of 393 participants working in eight secondary level public healthcare institutions from three districts of Jammu, J&K.

The findings indicated that very less number of the health care workers had good knowledge, attitude and practices towards patient safety measures, however many of them had fair KAP towards PSM. Study further showed that this KAP varies depending on the component of the patient safety measures we assess. The knowledge towards infection prevention and control (IPC) was better as compared to adverse events and the HCW's exhibited better Attitude towards organizational behaviour as compared to communication and feedback mechanism The results revealed that areas that need to be addressed related to promoting open communication, implementing effective training programs, standardized protocols and encouraging a scientific and systemic approach to error prevention thereby reducing preventable harm to the patient.

Key words: Health care worker, Patient safety measures**,** Infection prevention control, Bio medical waste.

Introduction

Patient safety can be considered as the prevention of patient injuries or adverse events that could occur during health care delivery[1]. Patient Safety Measures (PSM) has a large ambit and some major components of patient safety measures are bio-medical waste management (BMW), adverse events like healthcare associated infections (HAI), injection safety, blood safety, medication safety, medical device safety, safe surgical care and safe childbirth, safe organ, tissue and cell transportation, and much more. Failure to deliver safe care is attributed to unsafe clinical practices, unsafe and poor processes and poor systems[1].

Healthcare associated infection (HAI) are one of the most common adverse events in the health care delivery system. Of every 100 patients hospitalized at any given time, 7 in developed and 10 in developing countries will acquire Health Care-Associated Infections (HAIs). However, simple and low-cost infection prevention and control measures, such as appropriate hand hygiene, can reduce the frequency of HAIs by more than 50 per cent[1].

The other major contributor to harm in health care delivery is the biomedical waste (BMW) management. In South-East Asian region countries,56 per cent[2] of facilities lack adequate waste disposal and treatment. India generates 484 tonnes per day of biomedical waste from 168,869 HCFs out of which 447 TPD is treated[3]. Due to the impact HAI and BMW have on overall patient safety measures addressing them can considerably reduce preventable harm to the patients during service delivery in the health care settings.

According to the World Health Organization (WHO), patient safety is now a major global burden. It has been found globally that one in 10 patients is affected by adverse events. This figure rises to 18 per cent in the Eastern Mediterranean Region, and surprisingly 83 per cent of these events are preventable[4]. In India, as per the Harvard study published in 2013, mentions that 52 lakh injuries take place due to patient safety issues. It has also been reported that each year around 13.4 Crore adverse events occur in hospitals in LMIC's due to unsafe care resulting in around 26 lakh deaths[5]. Patient Safety studies show that additional hospitalization, litigation costs, infections acquired in hospitals, disability, lost productivity and medical expenses cost some countries as high as US$ 19 billion annually[1]. Hence The economic benefits of improving patient safety are compelling.

India's focus and sincerity on patient safety can be explained from constitution of a multi-stakeholder Patient Safety Expert Group in August 2016 which developed a National Patient Safety Implementation Framework (NPSIF) whose aim was to ensure implementation of patient safety activities in a well-coordinated manner and contribute to overall goal of improvement of quality of care within UHC context in India[6].

The Union territory of Jammu and Kashmir has been taking lots of initiatives in improving health sector and bringing in the reforms and change at fast pace, the results are also there to be seen with improved health indicators. Jammu and Kashmir has managed NNMR (Neonatal Mortality Rate) in single digit of 9.8 as compared to national average of 24.9. The same trend is in other key indicators as well like IMR at 16.3 as compared to 35.2 National average[7]. The institutional deliveries in J&K are at 92.4 per cent out of which a high of 86.8 per cent are in public health facilities whereas at national level out of the total institutional deliveries only 61.9 per cent[7] are at public health facilities This reflects of high dependence of major chunk of population on public healthcare facilities.

Patient Safety Measures (PSM) is a critical aspect of healthcare delivery, and healthcare workers play a central role in ensuring that patients receive safe and effective care. However, preventable adverse events and medical errors continue to be a major challenge for healthcare systems worldwide. In many cases, these errors are caused by lapses in patient safety practices, which can have serious consequences for patients and healthcare workers[4]. As health care worker is a key in delivery of services and, prevention and control of harm, it is imperative to understand the current knowledge, attitude and practices of healthcare workers regarding patient safety

measures for achieving the overall goal of a quality health care delivery system and Universal health coverage (UHC).

As the burden of harm during healthcare service delivery and its associated costs is increasing globally, gaining evidence regarding the level of knowledge, attitude, practice towards patient safety measures among HCW are important and significant to undertake the essential strategies required to improve the burden of harm and to enhance the quality of health care. However, there is a lack of study on this critical topic that addressed knowledge, attitude, practice towards patient safety measures among HCW in J&K. Present study would aware the hospitals, HCW's, local policy implementers, government, stakeholders, and researchers who want to conduct the study on this topic to manage and control the critical burden of incidents of harm or error during healthcare service delivery, which is growing alarmingly worldwide and needs to be addressed at the earliest.

Objectives

The present study aims at assessing the Knowledge, Attitude and Practices (KAP) among healthcare workers regarding patient safety measures and its components in Secondary level healthcare institutions of Jammu division. The study intents to provide recommendations for improving the KAP on patient safety measures.

Methodology

Study Design: Descriptive cross sectional study was conducted in Eight Secondary level public healthcare institutions of Jammu Division, J&K. These eight institutions were spread over three Districts of, Jammu, Samba and Reasi of Jammu division. These included three District Hospitals and Five from SDH (Sub District Hospital)/ CHC (Community Health Centre) / EH (Emergency Hospital) wherein data was collected. Data was obtained from the Healthcare workers which included Consultants, Doctors (Medical Officers/Dental surgeons) and Paramedical staff (Staff Nurse/ANM, Pharmacist, Laboratory Technicians and others) with others including MPHW (Male and Female)/ANM, Dental Tech, etc. and who fulfilled inclusion criterion of at least six months experience in healthcare facility and who had Direct contact with patients.

Sample Size Determination: Sample size was calculated by using the prevalence of Knowledge, Attitude and Practices in a study conducted at Asella Referral and Teaching Hospital, Ethiopia. The respective values of knowledge, attitude and practice were 58.7 per cent, 52.9 per cent and 50 per cent[8].

Sample Size was calculated by using the formula $n= Z^2p(1-p)/d^2$ and after putting in values was

$n=384$

Sampling Techniques, Data Collection Tools and Procedures: The facilities were determined on the basis of convenience sampling and Stratified random sampling was used to recruit the study participants among the health care workers. Next, the objective of the study was explained to them. A structured self-administered pre tested questionnaire was used to collect data to assess and investigate the Knowledge, Attitude and Practices (KAP) of health care workers (HCW) towards patient safety measures.

The questionnaire was designed using inputs from WHO Patient safety toolkit[9] and NHSRC developed Self-assessment checklist in SaQushal guidelines[5]. The questionnaire was adapted to meet the study settings.

The questionnaire consisted of following components in accordance with the study objectives:

- Socio-demographic and personal characteristics of the participants
- Knowledge of patient safety measures
- Attitudes toward patient safety measures
- Current practices related to patient safety measures

Knowledge, attitude and practices (KAP) for different aspects of the Patient safety measures (PSM) were evaluated after dividing the questions in different sections according to the area of concern of patient safety measures they captured. Further in the present study the question pertaining to knowledge, attitude and practice regarding patient safety measure were categorized as per below broad categories:

A. Knowledge about:
    - Infection Control practices like Hand Hygiene, Bio Medical Waste handling
    - Adverse events and Healthcare Associated Infection and reporting system along with Medication errors.
B. Attitude about communication and feedback mechanism, barrier and organizational behaviour.
C. Practices towards adverse events, IPC and other patient safety measures.

The collected data were checked, coded, and exported to Statistical Package for the Social Sciences (SPSS) version 26.0 for statistical analysis. Data were summarized using descriptive statistics.

Ethics Approval and Consent to Participate: Data were collected after the ethical clearance was received from Institutional Ethics Committee of The National Institute of Health and Family Welfare, Munirka, New Delhi. The participants were informed and given brief description concerning the purpose of study and its objective's, after which informed consent was obtained.

Findings

Distribution of Study Participants: A total of 393 health care workers (HCW) formed the strata for the study and were from eight secondary level public healthcare institutions of Jammu division, J&K. The age of the participants varied from 19 to 60 years. The average age of the participants was 38.75±11.5year.

Most of the participants (32.8%, n= 129) were aged between 56-65 years and the majority 60.8% (n=239) of them were female. Further a majority of them (76.1%, n=299) was married and the educational qualification of the HCW participating in this study comprised majorly of Diploma holders which was 56.2 per cent (n=221) as compared to 22.1 per cent (n=87) graduates and 19.8%(n=78) postgraduates of the total participants in the study as described in Table1. Also the

study population as per the work position comprised 31.0 per cent (n=122) staff nurse, 17.3 per cent (n=68) doctor and 23.9 per cent (n=94) others.

Table1

Distribution of HCW According to Socio-Demographic Characteristics

Value	Frequency	Percentage
Age Groups (in years)		
18-25	63	16.0
26-35	110	28.0
46-55	91	23.2
56-65	129	32.8
Total	393	100.0
Sex		
Male	154	39.2
Female	239	60.8
Total	393	100.0
Educational qualification		
Postgraduate	78	19.8
Graduate	87	22.1
Diploma	221	56.2
Others	7	1.8
Total	393	100.0
Marital status		
Single	89	22.6
Married	299	76.1
Divorced	3	0.8
Widow	2	0.5
Total	393	100.0

Knowledge among HCW on PSM: The data collected were analysed to understand the Knowledge that the health care workers have towards patient safety measures and its varied components. According to the data statistics the overall knowledge of the participants towards PSM shown in Fig 1. exhibits that 46.6 per cent (n=183) of HCW had Fair Knowledge, 44.0 per cent (n=173) poor knowledge and only 9.4 per cent (n=37) had good knowledge. Further Fig 2. shows that HCW have varied knowledge to different components. Mere 10.4 per cent (n=41) had good knowledge on basics of PSM while it was 14.5 per cent (n=57) regarding Adverse events and better percentage of 27.5 (n=108s) with good knowledge regarding IPC.

Figure 1
Knowledge among the HCW on PSM

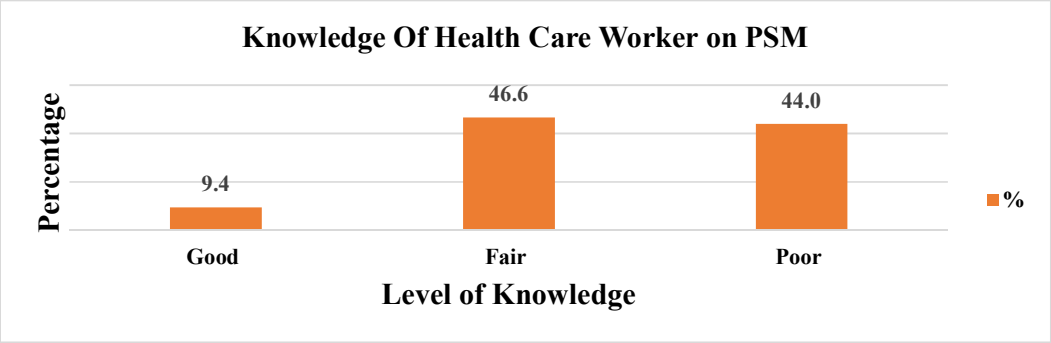
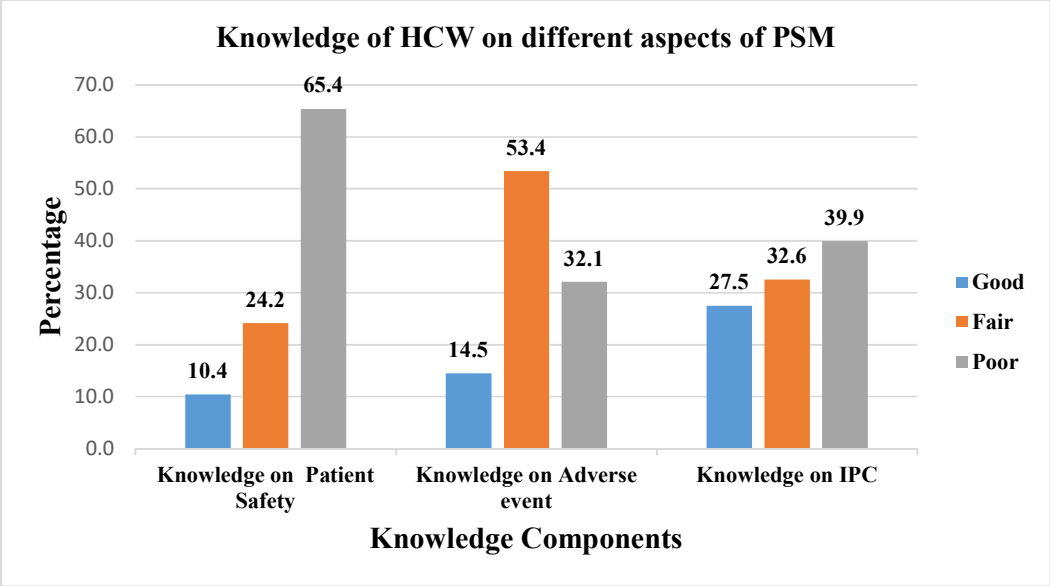


Figure 2
Knowledge of Respondents Pertaining to Different Components of PSM



Attitude among HCW on PSM: As shown in Fig. 3 24.4%(n=96) of HCW were with good attitude, 40.5 per cent (n=159) fair attitude and 35.1 per cent (n=138) showed poor attitude. Fig 4. very interestingly shows that the health care workers have different attitude towards different components that affect the implementation of PSM. They possess good attitude 46.1%(n=181) towards the positivity in the organizational behaviour and high percentage 43.3 per cent (n-170) perceive poorly for the communication and feedback mechanism.

Figure 3
Attitude among the HCW on PSM

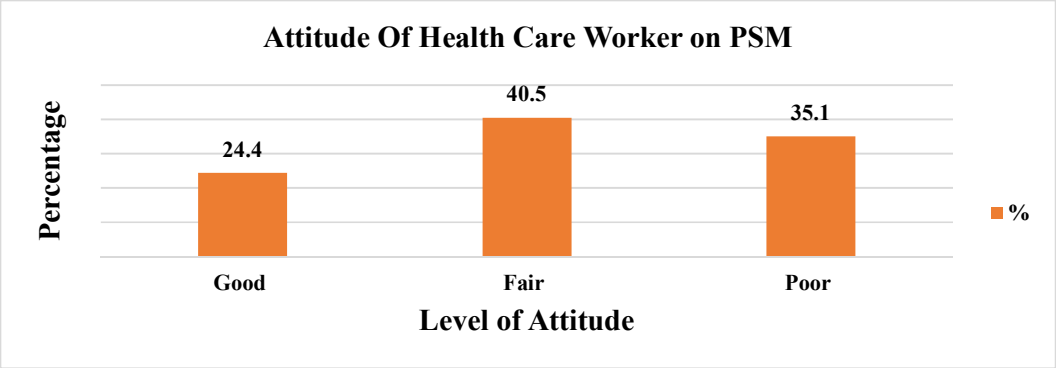
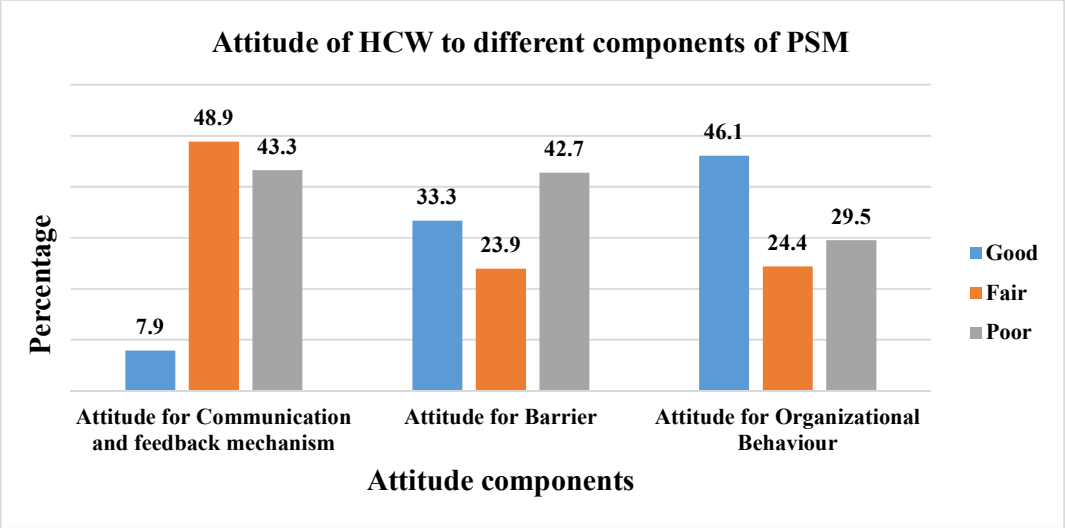


Figure 4
Attitude of HCW to Different Components of Attitude regarding PSM



Practices among HCW on PSM: Further Fig 5 reflects that good practices were followed by 36.1%(n=142) of HCW and 25.2% (n=99) were found to be practising fair practices with 38.7%(n=152) who had bad practices towards Patient Safety Measures. Fig 6. suggests that good practices related to IPC and adverse events are being followed in high percentage of 53.9%(n=212) however these good practices related to other's component of PSM are reduced to almost half 29%(n=114).

Figure 5
Practices among the HCW on PSM

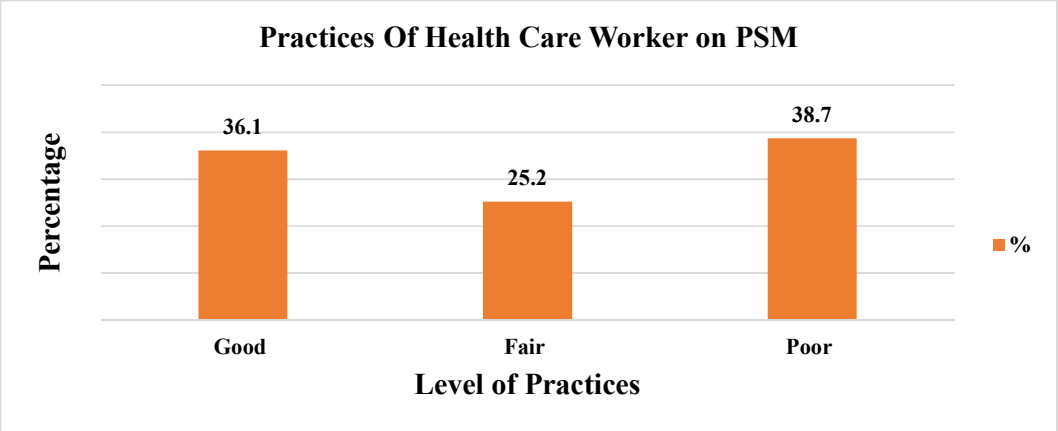
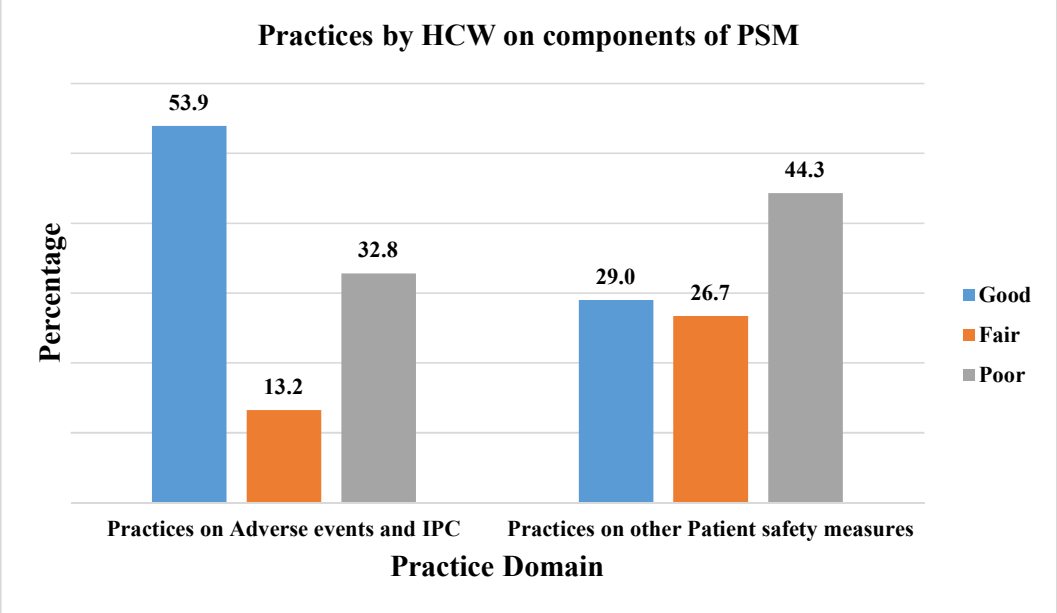


Figure 6
Practices of HCW Pertaining to Different Components of PSM



Discussion

Patient safety is a critical component of healthcare delivery system, aiming to prevent harm and adverse events to patients within healthcare settings. The population under study was heterogenous with a mixture of people of different ages, sexes, qualifications, etc. The mean age of the population was 38.75 ± 11.5years. The population comprised of 393 participants segregated into 39.2 per cent (n=154) males and 60.8 per cent (n=239) females. The respondents were having different levels of education with more than half 56.2%(n=221) being diploma holders 22.1 per cent (n=87) graduate and19.8 per cent (n=78) post graduates. One

noticeable finding from this seems to be the fact that more and more females are getting opportunities in the Healthcare HR (Human Resource).

Knowledge of HCW towards Patient Safety Measures: As one of the primary objectives of the study, the present study showed that the level of knowledge towards patient safety among the HCW was 9.4 per cent possessing good knowledge among the study population, however majority had fair knowledge 46.6 per cent (n=183) whereas poor knowledge among participants was 44.0 per cent (n=173). As was evident from the data about the knowledge and its different components, only 10.4 per cent had good knowledge about basics of PSM and 14.5 per cent to adverse event however the percentage rises to 27.5 per cent with good knowledge of IPC and this may be due to implementation of initiatives like Kayakalp which focus on hospital upkeep, hygiene promotion and infection prevention and control. The findings of knowledge on HAI in case of study conducted in Joseph Hospital, Tamilnadu shows 85 per cent[10] of the health workers had good knowledge the difference in the results in both studies can be attributed to the fact that it graded knowledge in good and poor only whereas in present study its graded as good, fair and poor. In present study the good and fair together make 67.9 per cent of total health worker which is near to the Tamilnadu study findings. However, also the knowledge gap in PSM can be attributed to it's being in early stages of implementation in the health care system as well.

The comparative statistics observed in the present study for knowledge was lower when compared with a study conducted in Asella Hospital Ethiopia which reported the knowledge of nurses towards patient safety as 58.7 per cent (n = 101) and 41.3 per cent poor knowledge[8], also Public University of Paraná, Brazil, which reported the knowledge of nurses' towards patient safety as 89.8 per cent[11]. Further the study conducted in Saudi Arabia reported the self- rated good level of knowledge on patient safety at 52.7 per cent[12]. In another study conducted in Urmia University of Medical Sciences, West Azerbaijan province, Iran, wherein the level of good knowledge towards patient safety was 50 per cent[13]. This variation can be attributed to the use of different scales used for knowledge assessment in the Ethiopian study and other two studies, and thus can be the reasons for disagreement in results with the present study.

Attitude of HCW towards Patient Safety Measures: The present study showed that the HCWs with good attitude towards patient safety was 24.4 per cent (n=96) and fair attitude 40.5 per cent (n=159) which together are around 64.9 per cent. However, 35.1 per cent (n=138) is having poor attitude. Also, pertinent that the health care worker in the study showed varied attitude to different components of attitude. Participants had 46.1 per cent good attitude towards organizational behaviour and a low of 7.9 per cent to the communication and feedback mechanism. This can be attributed to not so well-established principles for feedback yet in the system. While in comparison of attitude of the study population with other study it was observed that there are 52.9 per cent with good attitude in Asella Study[8] and 47.1 per cent with bad attitude. On the same principle of assessing the people with poor attitude it is seen in the present study that lesser health care worker 35.1 per cent (n=138) are with poor attitude as compared to 47.1% in the Asella. Meanwhile a study conducted in Manisa, Turkey, shows the health professionals' attitude towards patient rights and patient safety was 100 per cent[14]. Also another study finding conducted in University of Gondar showed the level of positive attitude of patient safety was 84.33 per cent[15]. One more study finding conducted in the Central Saudi Arabia reported the overall perception of patient safety among participants as 57.9 per cent[16]. In the Study conducted

in Jimma Zone Public Hospitals the overall perception of patient safety was found to be 36.77 per cent[17].

The present study shows that the attitude is better in HCW as compared to knowledge. As the study participants were a mix of different strata can be the reason for such trends on different dimensions of the attitude.

Practices of HCW towards Patient Safety Measures: The level of good practice towards patient safety among the respondents in this study was 36.1 per cent (n=142) with 25.2 per cent (n=99) having fair practices and 38.7 per cent (n=152) poor practices. On the contrary in the Asella study the good and bad practices among the nurses was at 50 per cent (n = 86)[8] each. The percentage of staff with poor practices in present study is 38.7 per cent far less than Asella study. Further Practices among HCW towards varied components of PSM suggests that good practices related to IPC and adverse events are being followed in high percentage of 53.9 per cent (n=212) however these good practices related to other components of PSM are reduced to almost half 29 per cent (n=114). The good practices on HAI in Tamilnadu study are at 60 per cent[10] which is close to the 53.9 per cent good practices on Adverse events in the present study. These better percentages in practices can be attributed to many positive initiatives that have been taken by the Government of India(GoI) through Ministry of Health to improve the overall Patient safety culture and thereby improving Patient safety measures in the health system through programmes like Kayakalp under Swach Bharat and more importantly concerted efforts of improving Quality of care by implementation of various Quality initiatives of MoH&FW through NHSRC like NQAS, LaQshya, MusQan and many more

Conclusion and Recommendations

The present study attempted to assess and obtain a baseline data regarding the knowledge, attitude and practices the health care workers possess about patient safety measures and which will be beneficial in further planning and devising strategies to improve the culture of patient safety in the health care facilities of Jammu and Kashmir, also supplementing in continued research. The major findings that came out of the study were that there was a knowledge gap among health care workers however the positives out of the study were the better attitude and improved practices towards some components of the PSM. The study emphasized that collaboration among health care professionals, policymakers and other stakeholders are essential in these ongoing endeavours to ensure the highest standards of patient safety.

The results of this study highlight the need for targeted interventions and educational programs to improve patient safety knowledge, promote positive attitudes, and enhance adherence to patient safety practices among healthcare professionals. By addressing the knowledge gaps, misconceptions, and barriers, healthcare organizations can work towards creating a safer environment for patients and reducing preventable harm. The present study suggested to conduct continued trainings of all cadres of HCW's about patient safety measures and make available all essential patient safety practice guidelines at point of care in the form of Protocols and guidelines. Further Regular monitoring was suggested and availability of robust Feedback mechanism to be ensured.

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Public Health Crisis of Road Accidents and Socio-Economic Determinants: A Cross Sectional Study from South Karnataka, India

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Abstract

Road traffic accidents rank as the eighth leading cause of death globally and represent a major public health concern. Belonging to a socio-economically disadvantaged group exacerbates the risk of involvement in traffic accidents. This study aims to investigate the relationship between socio-economic disparities and traffic accidents in South Karnataka, India. A cross-sectional, mixed-methods study was conducted, analyzing data on road accidents that occurred between 2018 and 2022 in selected districts of Karnataka. Data were obtained from local police records, encompassing a total of 4,998 cases. Binomial logistic regression was employed to examine the influence of low socio-economic determinants on road crashes.

The Hosmer-Lemeshow test indicated a strong correlation between low levels of education and road accidents (p = 0.21). Similarly, unskilled occupations showed a significant association with crash rates (p = 0.01). Both young and elderly individuals experienced higher mortality rates compared to other age groups. Additionally, prolonged poverty, social exclusion, and deprivation were significant risk factors, making marginalized castes particularly vulnerable to road accidents. Socioeconomic disparities, including education, occupation, and caste, significantly contribute to an elevated risk of road traffic accidents. These factors are closely linked to social exclusion and disadvantage. Targeted community engagement and interventions tailored for drivers and vulnerable populations from underserved communities are recommended to mitigate this issue.

Key words: Socio-economic, Inequalities. Deprivation, Caste, Accidents, Vehicles.

Introduction

Road traffic accidents have emerged as a major public health challenge worldwide. Rapid urbanization and increased motorization are contributing to significant social and economic challenges in both developed and developing nations. Globally, road traffic accidents are the eighth leading cause of death, resulting in approximately 1.35 million fatalities each year[1]. In India, over 150,000 people lose their lives annually due to road crashes, with Tamil Nadu reporting the highest fatalities at an alarming rate of 35 deaths per day. If current trends persist,

projections indicate that by 2025, road traffic crashes could cause death or injury to 63 per cent of the global population[2].

In Karnataka, road accident statistics have fluctuated from 2019 to 2022. The number of accidents decreased slightly in 2020, likely due to the COVID-19 pandemic, from 40.66 thousand in 2019 to 34.18 thousand. However, this number rose again in 2021 to 34.65 thousand and increased further to 39.76 thousand accidents in 2022. The increase in fatalities, from 344 in 2020 to 723 in 2024, highlights the growing severity of the issue (NCRB Reports, 2024). Since 2000, social scientists have increasingly focused on the demographic and socio-economic factors influencing road traffic accidents, recognizing these as significant correlates in understanding crash incidence. Studies consistently show that lower-income regions, especially middle- and low-income households, experience a disproportionate share of road crashes. Drivers from lower socio-economic backgrounds are involved in nearly twice as many accidents as those from higher-income groups. Factors such as limited education, financial insecurity, unskilled employment, and poverty-related mental health conditions contribute significantly to this elevated risk[3,4].

Demographic factors also play a critical role. Males, especially those in their second and third decades of life, are more frequently involved in crashes. In economically disadvantaged families, young individuals often begin working early, exposing them to greater crash risks. Research from countries like Iran and the United States supports this, showing that adults from low socio-economic communities are particularly vulnerable to road accidents. Furthermore, trauma care studies in France indicate that individuals from lower socio-economic backgrounds disproportionately rely on universal healthcare insurance for road injury treatment[5,6].

In India, individuals from lower socio-economic backgrounds are particularly vulnerable to road accidents for several reasons. These groups often lack the financial means to afford proper road infrastructure, vehicle maintenance, or insurance. As a result, they tend to own older, less safe vehicles, further increasing the likelihood of accidents. After an accident, access to timely and quality medical care remains a challenge, as socio-economic disparities limit access to essential health services, worsening the severity of injuries[7]. Marginalized communities, such as those belonging to lower castes (Scheduled Castes, Scheduled Tribes, and Other Backward Classes), face compounded risks due to social exclusion, poverty, illiteracy, and stigma. These communities often experience higher rates of road accidents, driven by their disadvantaged socio-economic status, lack of access to road safety education, and insufficient healthcare resources. Furthermore, these groups are less likely to have the social capital needed to navigate the complexities of road safety and emergency healthcare systems[8].

India's caste-based social structure exacerbates these risks. Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC) are particularly vulnerable due to entrenched social exclusion and economic deprivation. These communities are often marginalized in terms of access to education, healthcare, and economic opportunities, which increases their exposure to road traffic accidents. Social exclusion, coupled with limited access to road safety education and basic health services, further intensifies their vulnerability to road crashes and injuries[9,10].

Addressing the intersection of socio-economic disparities and road traffic accidents in India requires a comprehensive and multi-dimensional approach. Improving access to education, promoting occupational skills, enhancing mental health support, and fostering inclusive community programs are key strategies to mitigate the impact of socio-economic vulnerabilities on road safety. Special attention must be given to marginalized communities to reduce the impact of social exclusion on their road safety outcomes. It is essential to develop targeted interventions aimed at improving road safety awareness and access to healthcare for disadvantaged populations, especially in rural and economically disadvantaged regions.[11,12] This study aims to examine the socio-economic factors influencing road traffic accidents in Karnataka, focusing on caste, education, occupation, and poverty, with the goal of developing a more equitable road safety framework that can benefit all sections of society.

Objective

The basic objective of the study was to look into the relationship between socio-economic determinants and disparities of road-accident victims; and their families in South Karnataka.

Methodology

The current study was conducted in five districts of Karnataka state, located in southern India. Data were collected from various police stations across five multi-caste populated districts: Mysuru, Bangalore, Ramanagara, Kodagu, and Chamarajanagara based on accident rates, population size, or socio-economic status. Accident cases registered between 2018 and 2022 were retrieved from 23 police stations in these districts, focusing on two-wheeler and four-wheeler accidents. A total of 4,998 cases were analyzed, categorized by victim characteristics such as gender, education, occupation, caste, and whether the outcome was fatal or non-fatal.

In selected cases, we engaged with accident survivors and the relatives of fatal victims to gather additional information. First Information Report (FIR) copies from the police were retrieved (with permission) to investigate the specific causes of accidents and assess property damage. Ethical clearance was obtained from a local institution. Since reliable income data were not available in police records, socioeconomic variables like education, occupation, and caste were used as proxies for analysis. The dependent variable in the study (fatality) is qualitative and dichotomous. A binomial logistic regression model was employed to assess the influence of independent variables (gender, caste, education, and occupation) on the dependent variable (accident outcome).

In addition to quantitative data, qualitative insights were gathered through in-depth interviews and focus group discussions (FGDs) with accident survivors, police personnel, legal professionals, NGOs, and academics. These interactions involved 10–12 open-ended questions, aiming to understand broader perceptions of road accidents. The data were analyzed using SPSS version 18.0 (IBM) for quantitative variables with a 95 per cent confidence interval, and qualitative data were processed with the NUD*ISD database. Missing and erroneous values in the dataset were excluded to ensure accuracy.

The dependent variable for the regression model was defined as binary, with "injuries" coded as '0' and "deaths" coded as '1' (Table 3). Independent variables included: Gender has been classified as male and female, with females as the base category. The negative coefficient for males indicates that males have a lower likelihood of dying in accidents compared to females. Caste of the victims was categorized as SC, ST, OBC, and General, with General serving as the base category. Education has been classified as basic/just-educated and uneducated, with uneducated as the base category. Occupation has been Classified as skilled, unskilled, and students, with students as the base category. The regression model demonstrated good predictive performance, accurately predicting 73 per cent of the outcomes. While the model successfully predicted all fatalities, some omissions in injury cases were noted, primarily due to incomplete police documentation. Separate estimations for injuries and fatalities could not be conducted due to data constraints. Additionally, categorical variables with more than two levels were not analyzed using dummy variables.

Findings

Table 1

Socio-economic Background of the Road Accident Victims

Gender					
		Death	Injured	Total	p Value*
Male	Count	1188	160	1348	0.00
	%	88.1%	12.0%	100.0%	
Female	Count	2998	652	3650	
	%	82.1%	18.0%	100.0%	
Total	Count	4186	812	4998	
	%	83.8%	16.2%	100.0%	
Education Level					
		Death	Injured	Total	0.21
Low level of schooling	Count	1104	244	1348	
	%	81.9	18.1	100.0%	
Un schooling	Count	3138	512	3650	
	%	86.0%	14.0	100.0%	
Total	Count	4242	756	4998	
	%	84.9	15.1	100.0%	
Occupation Level					
		Death	Injury	Total	0.01
Students	Count	89	312	401	
	%	6.6	42.7	100.0%	
Skilled	Count	576	1777	2353	
	%	42.7	48.7	100.0%	
Unskilled	Count	683	1561	2244	
	%	50.7	42.8	100%	
Total	Count	1348	3650	4998	
	%	26.9	73.0	100.0	
Caste of the Victims					
		Death	Injury	Total	0.00

Scheduled Caste	Count	224	648	872
	%	16.6	17.8	100
Scheduled Tribe	Count	185	506	691
	%	13.7	13.9	100
Other Backward Caste	Count	725	2050	2775
	%	53.8	56.2	100
Others	Count	214	446	660
	%	15.9	12.2	100
Total	Count	1348	3650	4998
	%	26.9	73.0	100

Sources: Police Records, 2017-2020 * All Significant

Figure 1

Age of the Victims

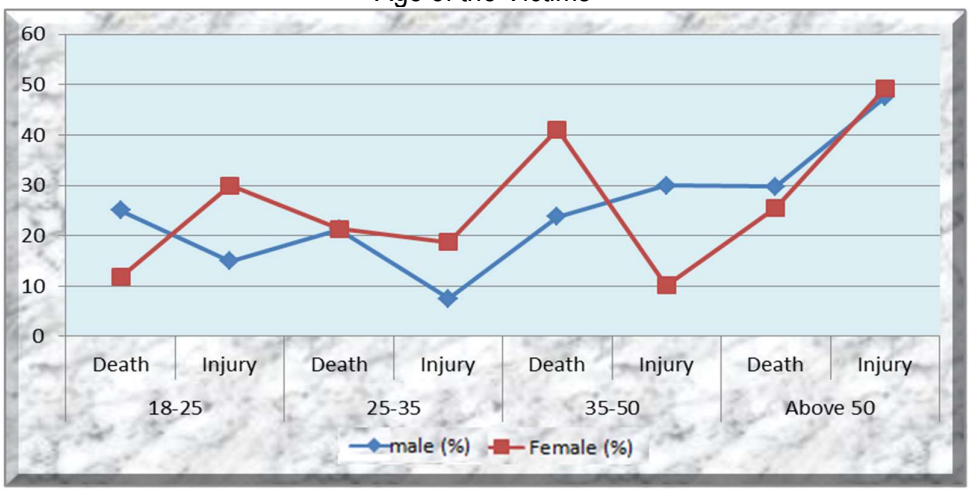

Table 2

Results of the Logistic Regression

Variables	Exponent of the Coefficient	P- Value	95% Confidence Interval for Exponent of the Coefficient	
			Lower	Upper
Gender (1) - Male	.55	.000	0.46	0.67
Age	1.43	.019	1.23	1.43
Caste				
SC (1)	1.58	.000	1.29	1.94
ST (2)	1.33	.016	1.06	1.69
OBC (3)	1.45	.000	1.21	1.73
Education	1.22	.021	1.02	1.46
Occupation				
Un Skilled/ (1)	1.54	.001	1.20	1.98
Skilled (2)	1.48	.000	1.30	1.69
Constant	2.19	.000		

Note: Gender: Male and Female with Female as base category; Caste: Scheduled caste (SC), Scheduled Tribe (ST), and Other Backward Caste (OBC) with General as base category; Occupation: Skilled and Unskilled with Students as base category. Gender (1) denotes Male, Caste (1) (2) (3) denotes SCs, STs, and OBCs, Occupation (1) (2) denotes unskilled/students and skilled

Table 3
Classification Table

Observed		Predicted		
		1= Dead, 0= Injured		Percentage Correct
		0	1	
1= Dead, 0= Injured	0	3650	0	100
	1	1348	0	0
Overall Percentage				73

The logistic regression analysis reveals the following significant relationships between the predictors and the dependent variable (frequency of road accidents):In the case of gender Male respondents are 0.55 times as likely as females (base category) to be associated with road accidents (Exp(B) = 0.55, p = .000). Next, Age is positively associated with road accidents. Each unit increase in age raises the likelihood by 1.43 times (Exp(B) = 1.43, p = .019). Further, Scheduled Castes (SC): Individuals from SC communities have 1.58 times higher odds of being involved in road accidents compared to the General category (Exp(B) = 1.58, p = .000). Scheduled Tribes (ST): Individuals from ST communities have 1.33 times higher odds (Exp(B) = 1.33, p = .016). Other Backward Classes (OBC): Individuals from OBCs have 1.45 times higher odds (Exp(B) = 1.45, p = .000). in the case of Education Individuals with low levels of education (primary or below) are 1.22 times more likely to be associated with road accidents compared to higher education levels (Exp(B) = 1.22, p = .021). However, in the case of Occupation Respondents in unskilled roles have 1.54 times higher odds of road accident involvement compared to students (base category) (Exp(B) = 1.54, p = .001). Skilled workers have 1.48 times higher odds compared to students (Exp(B) = 1.48, p = .000). In summary, male respondents are significantly more likely to be associated with road accidents, with a high statistical significance (p < .001). Socio-economic factors like caste (SCs, STs, and OBCs), low education levels, and occupation (skilled and unskilled roles) are strong predictors of road accident frequency. The model provides evidence that both demographic and socio-economic variables are critical in understanding the likelihood of road accidents. This table (2) underlines the significant impact of socio-economic and demographic characteristics on road accident frequency, supporting arguments for targeted interventions.

Discussion

The objective of this study is to examine road accidents through the lens of key socio-economic determinants using a cross-sectional study design. The findings are robust, owing to the large sample size and the inclusion of diverse community-based samples from various strata of Indian society. In terms of geographical distribution, Bangalore, as a metropolitan city, recorded the highest number of accident-related deaths and injuries, followed by Mysore city during the study period. Regarding the victims' demographics, over 71 per cent of male and 29 per cent of female victims were from rural areas (Table 1). Gender-wise, the fatality rate was higher among men (88%) compared to women (82%). Male drivers were more prone to fatal accidents than female drivers, likely due to spending more time on the roads. Additionally, studies indicate that males from disadvantaged backgrounds often exhibit risky and careless road behaviour and disregard for traffic rules. Notably, the gender gap in crash fatalities per accident has been narrowing in

recent years, aligning with trends reported in the NCRB Report (2018[13,14]. Also, cultural or behavioural factors that further contribute to these disparities cannot be ruled out.

This study, however, revealed a slightly higher proportion of non-fatal injuries among female victims (18%) compared to male victims (12%). While this gap is relatively small, it indicates that the gender disparity in non-fatal injuries is also narrowing over time[15]. This shift could be attributed to the increased economic independence and employment opportunities available to all genders in the era of globalization. Consequently, more women, especially those from lower socioeconomic backgrounds, are spending a significant amount of time on the road for work and other purposes[16,17]. Understanding gender differences in road behaviour is essential. Research suggests that males often demonstrate better driving skills, whereas females tend to be less aggressive and more likely to adhere to traffic rules. Additionally, as women age, they may experience heightened driving stereotype threats compared to men[18]. Despite these observations, experts emphasize the need for new data to better understand and address the gender gap in non-fatal road accidents.

Regarding age, both younger and older individuals (of both genders) are more likely to be involved in accidents compared to middle-aged individuals. Male riders, across all age groups, are slightly more likely to experience fatalities than female drivers. Interestingly, older women were involved in significantly more accidents than men, and the injury rate among elderly females (49%) was higher than that of their male counterparts. It has been observed that the number of fatalities and injuries increases with age (Fig 1). When combined with a poor socioeconomic status, age becomes a particularly crucial factor. In such deprived conditions, a lower socioeconomic status can lead to a rapid decline in cognitive and mobility abilities, further increasing the risk of accidents. Age groups, however, exhibit variations in terms of the type of transportation used and the severity of the accidents[19,20].

Low levels of schooling are more prevalent among marginalized and underprivileged groups, which contribute significantly to road accident fatalities and injuries. This study reveals that 86 per cent of illiterate individuals have succumbed to accidents, with the injury rate also notably higher among those with limited education. The findings indicate a clear correlation between educational attainment and mortality rates in both urban and rural populations[21].Other studies have highlighted an inverse relationship: as the level of education increases, the likelihood of accident-related fatalities and injuries decreases. Educated individuals are also less likely to be involved in accidents caused by reckless behavior such as alcohol consumption or speeding.[4,17] Interviews with accident survivors revealed that individuals with lower levels of education often possess limited knowledge and awareness about crucial safety measures, such as wearing helmets, using seatbelts, and understanding traffic signs. Furthermore, these individuals may have inadequate understanding of traffic rules and norms, which increases their vulnerability on the road [22,23]. The heightened risk among those with lower educational levels can be attributed to a range of factors, including behavioral issues, lack of awareness about road safety, contextual challenges, and vehicle-related problems. These individuals are often less equipped to navigate the complexities of road safety, making education a key factor in reducing accident-related harm. The findings underscore the need for targeted educational initiatives aimed at improving road safety awareness among disadvantaged populations[20].

In addition, studies have established a clear link between poverty and road accidents. Low levels of education typically lead to unskilled employment, which in turn results in low wages and material deprivation[3,14,17]. After adjusting for age and sex, it was found that the mortality rate from road crashes is significantly higher among unskilled workers (50.7%), most of whom are employed in the unorganized sector[24,25]. Interestingly, students and unskilled workers experience similar injury rates, which warrant further exploration. This study also revealed that many of these students come from low-income, rural backgrounds. According to a World Bank study (2018), low-income households are twice as likely as high-income households to experience fatal traffic accidents, and crash-related disabilities are also more common among poor families. Poverty and limited income hinder the ability to invest in safe driving practices, crash-proof vehicles (such as those with airbags), and timely vehicle maintenance. This financial strain is a significant factor contributing to the rising mortality rate. Due to financial constraints, many low-income individuals rely on second-hand or poorly maintained vehicles, which tend to have lower crash ratings and outdated safety features[26]. Interviews with accident survivors revealed that around 68.5 per cent of injured victims reported that their vehicles were old and had faulty systems, further highlighting the risks associated with inadequate access to safe and well-maintained vehicles. This evidence reinforces the need to address economic disparities and invest in safer, more reliable transportation options for disadvantaged communities[26].

Recent studies have highlighted the sensitivity of specific groups to road crashes, with a growing focus on socio-economic and caste-related factors[4]. Consistent with previous research, our findings indicate that individuals from Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC) with low socio-economic profiles—such as poverty, deprivation, low education, unskilled employment, and underpaid jobs—are more likely to experience road accidents compared to individuals from forward castes[15,17]. Poverty, low levels of education and low-paying jobs are particularly prevalent among these marginalized groups. The OBC category, in particular, exhibits the highest rates of both fatalities and injuries, largely due to the concentration of economically disadvantaged sub-castes within this group, followed by the SC group. Interestingly, the relationship between minority status and road accidents was not found to be significant in the adjusted model. Therefore, it can be concluded that caste itself does not significantly influence road crash outcomes, but rather the socio-economic factors associated with caste and class are more determinative in accident susceptibility[6].

The focus group study revealed that individuals from deprived castes often experience a range of socio-psychological challenges, including historical isolation, rejection, and deprivation, which contribute to low self-esteem, insecurity, and a sense of not belonging. These factors, along with poor social networks, discrimination, and health issues, are prevalent among these groups and may significantly increase their risk of being involved in road accidents[16]. Certain personality traits, such as low self-esteem, aggression towards co-riders, reckless behavior (like illegal driving, showboating, wheelies, and triple riding), frequent signal violations, and the presence of depressive disorders, are more common among youth from disadvantaged backgrounds. These behaviors likely contribute to the higher incidence of traffic accidents in this demographic. Furthermore, there is a close relationship between income, mental health, and social capital, with each factor impacting rider behavior on the road. Limited income often restricts access to safer vehicles and driving education, while mental health issues and weak social networks may exacerbate risky behaviors, creating a compounded effect on road safety[5]. These findings

suggest that addressing the underlying socio-economic and psychological factors is crucial in reducing accident rates among marginalized groups.

The majority of respondents believed that individuals from low economic backgrounds, who often spend significant time on the road, face a higher risk of road accidents. Our interviews further revealed that many of these individuals come from economically disadvantaged regions, where access to quality trauma care is limited. In numerous cases, poor accident victims do not receive legal compensation due to a lack of education, awareness, and financial resources. Many are unable to afford the fees of lawyers to pursue legal action. As a result, victims suffer additional losses, including lost income and employment due to disability and hospitalization[15]. Moreover, it was found that over 92 per cent of victims lacked basic insurance, and more than 71 per cent were from underserved areas. People from low socioeconomic groups were more likely to rely on government health insurance for managing the aftermath of crashes. These findings highlight the compounded challenges faced by disadvantaged individuals in the aftermath of road accidents, underscoring the need for better access to legal, financial, and healthcare resources for these communities.

Future research on road crashes could explore the following areas: 1) the involvement of social roles and conditions in causing both minor and major accidents, 2) the consideration of accidents as a socially inappropriate form of deviance, and 3) how poverty contributes to reduced road safety among marginalized groups. Some limitations of the study include: 1) its cross-sectional nature, which prevents generalization about causality and injury relationships, 2) insufficient data from police records, 3) limited focus on individuals from forward castes, 4) a lack of comprehensive qualitative data to explain the precise role of low socio-economic factors in road crashes, 5) the exclusion of environmental and driver characteristics from the analysis, and 6) the absence of specific data on property damage or losses from police records.

Conclusion and Recommendation

This study highlights the significant impact of socio-economic factors such as education, occupation, and income on road accident rates. Lower socio-economic status is directly linked to higher rates of road trauma and injuries, with uneducated and unskilled individuals at greater risk. It is recommended that the government focus on improving the socio-economic conditions of high-risk groups and introduce affordable insurance schemes for them. Additionally, a more stringent monitoring system for issuing driving licenses to individuals with limited education is crucial, along with integrating road safety education at the school level. The study also emphasizes the need for more research to explore the specific socio-economic mechanisms contributing to road accidents, especially among marginalized communities. Targeted, region-specific road safety interventions, engaging local populations, and longitudinal studies are essential to reduce disparities in road safety and trauma. Additionally, fostering the social construction of responsible road behaviour should be a key part of these efforts. To address the unique needs of different communities, a regionally and culturally specific crash reduction model that engages local populations is urgently needed. Longitudinal studies or intervention-based studies also recommended in this issue. In conclusion, addressing socio-economic disparities, improving education, and fostering safe road behaviour are vital steps in reducing road accidents and their impact on public health.

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Prevalence and the Factors Associated with Overweight and Obesity in Srinagar City, Northern India

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Abstract

The growing prevalence of overweight and obesity is an emerging problem in many developing countries including India. Recent data clearly indicates a high prevalence of obesity among young adults in India. Therefore, the present epidemiological study was designed to assess the prevalence and factors associated with overweight and obesity among Asian Indians living in district Srinagar of Kashmir valley. A questionnaire was designed to collect the data on age, gender, family income, and marital status, family history of obesity, educational level, and occupation and so on. An Asian specific body mass index cut off was used to determine overweight and obesity. Information was also collected on their physical activity, duration and intensity of exercise per week. Multivariate logistic regression was used to determine the strength of the association among risk factors with significant effect on the outcome (obesity) and was reported with adjusted Odds Ratio (AOR) at 95 per cent confidence interval. According to WHO guidelines, prevalence of overweight among young adults of Srinagar was found to be 12.2 per cent and that of obesity was 8.3per cent, women were more obese than men. Family history was found to be a strong determinant. Thus it was concluded that overweight and obesity is a major nutritional disorder in capital city of Kashmir valley in contrast to the perception that obesity is not that common in Kashmir.

Key words: Overweight, obesity, prevalence, malnutrition, body mass index young adults

Introduction

Obesity is a global public health issue. Worldwide obesity rate has tripled in the last four decades and is affecting both developed and developing countries[1-3]**.** Increasing ease of life, due to reduced physical labor and automated transportation, an increasingly sedentary lifestyle, and easy access to calorie-dense food, driven by remarkable economic growth in many parts of the world in the last century, have turned a once rare disease into one of the most common diseases[4,5]. In India, a nutritional transition has taken place from typical carbohydrate diet to fast food dietary habits, particularly among young adults. Obesity is associated with a large number of life threatening disorders, such as cardiovascular, metabolic and other non-communicable diseases.[6] In India, prevalence of obesity is around 50 per cent in women and 32.2 per cent among men in the upper strata of the society[7]. Kerala ranks second among Indian states with the prevalence of overweight 17 per cent and obesity 3.8 per cent. In Kashmir valley (Northern India), the prevalence of obesity in young adults aged 20-40 years is around 5 per cent. Main comorbidities associated with obesity includes type 2 Diabetes, Hypertension, Stroke, Coronary

Heart diseases, Gall bladder diseases, Arthritis, Psychological problems and so on. The social implications of obesity are major problem areas that are often neglected[8]. The obese individuals do less well academically, have poorer job prospects and also lower self-esteem. The students are at high risk side as far as obesity is concerned and this is mainly because of the modernization and industrialization leading to sedentary life style and unhealthy eating pattern. Many studies have been conducted on students in many countries that suggest that obesity is a problem among these population groups[9-11]. Since this obesity has become an alarming sign it is very important to prevent this by young adult based approaches such as changes in life style and health education. We need to educate all of these young adults about issues related to diet, exercise to be obese or not and behavioral change. We need to discuss the stigma of obesity and how we can combat it. Before starting a health and nutrition education programme to our young adults we want to assess the burden of the problem in our Institution. Hence the present cross sectional study was carried out with the objectives of estimating the prevalence of overweight and obesity among the young adults of Universities and as well as outside Universities and also to assess the factors influencing the development of obesity and overweight.

Objective

The objective of this study was to assess the prevalence and factors associated with overweight and obesity among Asian Indians living in Srinagar district of Kashmir valley, Jammu & Kashmir.

Methodology

Study Population: Kashmir Valley, located in the northern region of Indian subcontinent, is surrounded by the Himalayas and borders such as China and Pakistan. The valley has ten districts (administrative units). Srinagar is the summer capital of Jammu and Kashmir and is the most densely populated district in Kashmir Division. Srinagar covers an area of 294 km^2. According to the 2011 National census, the district has a population of 1236829 individuals (males: 651124; females: 585705). The total population of young adults (20 to 30 years) in Srinagar is 278074 (males, 144606 and females 133468). A total number of 1500 young adults were selected for the present study. Respondents in the age group of 20-3- years were taken from various Universities as well as general population.

Young adults were selected from two renowned universities of Srinagar namely University of Kashmir (KU) and SKUAST. A multistage sampling procedure was adopted to select the desired population from various faculties and departments of universities. Multistage sampling was used to select the sample because universities are bifurcated into various faculties and departments. Departments were chosen from faculties using a statistical technique called as probability proportion to size and students from each department were selected by systematic random sampling technique. The individuals below and above the age range (20 to 30 years) were excluded from the study. As far as selection of young adults outside universities is concerned, the sample was taken by stratified sampling method because total population of Srinagar is divided into smaller groups or strata i.e. administrative zones, North, East, South and West. Further a list of administrative wards from each zone was framed. Out of the 34 wards, 16 wards were selected (four from each zone) keeping in view the geographical location of the wards. From each ward, 50 households were selected. Households and young adults were selected by simple

random sampling technique. A house-to-house survey was undertaken to determine the number of persons aged 20-30 years. The houses in each selected wards were numbered starting with the first house closest to a fixed landmark in a colony.

Sample Size Calculation: The sample size was estimated for population by using the formula, $NZ^2P(1-P)/d^2(N-1)+Z^2P(1-P)$ this method takes into consideration the anticipated population proportion of 50.00%, absolute precision of 5.00% and confidence interval of 95.00%. Minimum sample size required to estimate the prevalence of obesity among young adults was thus estimated to be 500. The final sample size was however higher than this number keeping in view the non-response rate of samples as well as to strengthen the reliability of the results. Hence a sample size of 700 was used for the present study.

Data Collection: Data were collected from each participant using a predesigned, pretested questionnaire. Questionnaire schedule was designed on the basis of demographic variables, physical activities, and diet. Demographic variables such as age, sex, educational level, type of family, family income, and occupational status of the parents were noted. The socioeconomic status (SES) was assessed based on the modified Kuppuswamy classification[12]. Other study variables included frequency of consumption of various foods, fast food, fried snacks, chocolates, ice creams, sleep pattern, consumption of alcohol and smoking status, physical activity level were also studied. The participants were categorized on the basis of Body Mass Index i.e. weight in kilo gram divided by height in meter square). Criteria for Asian People are: an individual is underweight if BMI < 18.5, normal if BMI = 18.5 to 22.9, over weight if BMI= 23 to 24.9) and obese grade 1 when BMI= 25 to 29.9, obesity grade 2 (BMI >30). A digital weighing machine was used as a tool for measuring BMI, a calibrated height measuring scale was also used. The weighing machine was checked with known weights every day before starting the survey. Informed consent was obtained from the participants who were willing to participate in the study.

Statistical Analysis: The collected data were entered into Microsoft excel software and the analysis was done using SPSS software (Statistical Package for Social Sciences, version 16.0, SPSS Inc., Chicago, IL, USA). Chi-square test was used for determination of association of risk factors with obesity and was performed at 5 per cent significance level (95% C.I). In order to determine the strength of the association among risk factors with significant effect on the outcome (obesity) at 95% confidence interval, the logistic regression analysis was performed. Odds ratio more than 1 indicated strong association i.e. increased risk and odds ratio less than 1 indicated weak association i.e. decreased risk/ protective effect respectively taking into account of the confidence interval. The results were tabulated and graphically represented using Microsoft Office for Windows 2010.

Findings

Prevalence of Overweight and obesity: A total of 1500 young adults in the age group of 20-30 years were studied. Using WHO guidelines, it was found that almost half of the respondents (49.6%) were falling in the healthy weight category (BMI in the range of 18.5-22.9 kg/m^2). 12.2 per cent of the respondents was found to be overweight and 8.3 per cent were obese. It was found that the frequency of overweight was quite higher than obesity. Combined prevalence of overweight and obesity was 20.5 per cent among the included subjects. Average BMI of the

studied sample was found to be 21.5±3.5kg/m^2. A worrying scenario in the study happened to be the fact that one third of the respondents (29.8%) were underweight having BMI of <18.5 kg/m^2. Study showed a dual problem where on one side underweight people comprised a good percentage of the sample studied and on other side we also observed a good percentage of overweight and obesity.

Table 1

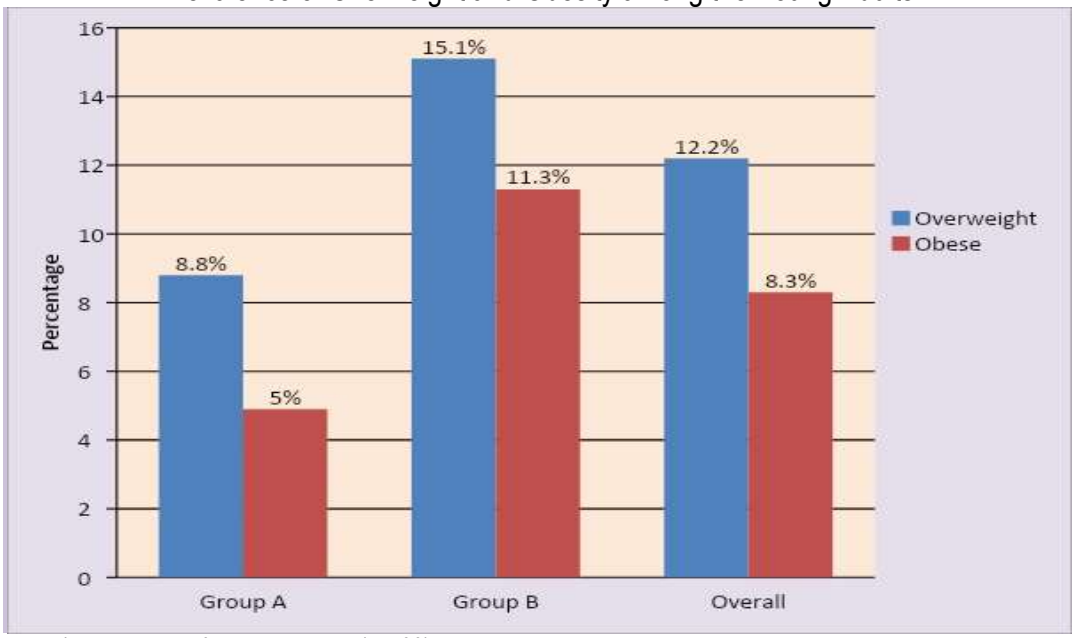
Distribution of Respondents as per Body Mass Index (BMI kg/m^2)

WHO ASIAN BMI CLASSIFICATION *BMI (kg/m^2)*	Group A No (%)	Group B No (%)	Overall No (%)	χ^2 value	p-value
Under weight (BMI <18.5 kg/m^2)	191 (27)	257 (32.1)	448 (29.8)	62.71	≤0.0001**
Healthy weight (BMI 18.5-22.9 kg/m^2)	412(58.8)	332(41.5)	744(49.6)		
Overweight (BMI 23-24.9 kg/m^2)	62(8.8)	121(15.1)	183 (12.2)		
Obese I (BMI 25-29 .9 kg/m^2)	22(3.1)	70 (8.75)	92 (6.1)		
Obese II (BMI >30 (kg/m^2)	13 (1.8)	20(2.5)	33 (2.2)		

** Significant at 5%

Figure 1

Prevalence of Overweight and Obesity among the Young Adults



* Young adults from Universities (n=700)

** Young adults (Outside Universities) (n=800)

Factors Associated with Overweight and Obesity: A total of 1500 young adults aged 20-30 years (mean age 25± 2.8 years) were selected for this study; 79.5 per cent was eutrophic,

12.2 per cent was overweight, and 8.3 per cent was with obesity. Table 3.2.1 shows associations between overweight and obesity and sociodemographic variables. Most of the women presented eutrophy (71.2%), 66.1 per cent was overweight and 60 per cent was obese in group A and in group B again, majority of women were overweight (90%) and obese (51.1%) but males were mostly eutrophic (55.4%). Distribution of the respondents as per type of family showed that a large portion of overweight and obese belonged to nuclear families in group A (56.5% & 62.8% respectively) but in group B majority of overweight belonged to joint families (51.2%) mainly. Relationship of overweight and obesity with marital status showed that majority of overweight and obese were unmarried in group A (55%, 51.5%) but in group B married adults were more likely to be overweight or obese compared to the unmarried adults (78.1% and 51%).

The risk of being overweight or obese was higher among rich respondents. It was found that majority of overweight as well as obese individuals in group A (56.4% & 71% respectively) and also in group B (67.8% & 57.7% respectively) belonged to a family with monthly income above rupees 40,000. Socioeconomic status wise distribution of the respondents showed that majority of subjects with overweight and obesity belonged to upper middle category in group A (35.5%, 31.4%) and in group B overweight mainly belonged to upper middle category (33.9%) and obese belonged to upper category (34.4%) of socio economic status.

A significant association was found in between genetic factors and overweight/obesity in group A as well as group B (p<0.000). It was found that majority of overweight and obese respondents were found to have a family history of obesity in group A (56.5%, 100%) as well as group B (82%, 81.1%) respectively as compared to eutrophic individuals and among these respondents (Table 3). Hypothyroidism was the main comorbidity found to be associated with obesity (57.1%), followed by gall stones (37.1%) in group A and in B diabetes was found to be the main comorbidity associated with obesity (34.4%) (Table 4).

There was a statistically significant association noticed between the physical activity levels and overweight and obesity both in group A and B (p=<0.0001). As evident from the table, obese individuals were found to be inactive as majority of them belonged to low physical activity levels (82.8% in group A and 65.9% in group B) compared to overweight respondents who were found to be moderately active (48.4%) in group A and 41.3% in group B) (Table 5).

Table 2

Relationship of Overweight/Obesity with Socio Demographic Variables

	Group A					Group B				
Variable	**Eutrophic N(%)**	**Overweight N(%)**	**Obese N(%)**	**χ^2**	**p-value**	**Eutrophic N(%)**	**Overweight N (%)**	**Obese N(%)**	**χ^2**	**p-value**
Age groups										
20-25	317(53)	30 (48)	13 (37.1	0.588	0.741	411 (69.7)	37(30.6)	5(5.5)	163.5	<0.0001*
25-30	286(47)	32 (52)	22 (62.8)			178(30.2)	84(69.4)	85(94.4)		
Sex										
Male	180(29.8)	21(33.9)	14(40)	0.741	0.690	321(55.4)	12(9.9)	44(48.4)	79.865	<0.0001*
Female	423(71.)	41(66.1)	21(60)			268(45.5)	109(90.1)	46(51.1)		
Type of family										
Nuclear	319(53.3)	35(56.5)	22(62.8)	3.14	0.208	424(71.9)	59(48.8)	46(51.1)	34.25	<0.0001*

Joint	284(47.9)	27(43.5)	13(37.1)			165(28.0)	62(51.2)	44(48.4)		
Marital status										
Single	578(96.7)	34(55)	18(51.5)	128.5	<0.0001*	435(73.8)	7(5.7)	44(49)	245.83	<0.0001*
Married	11(1.8)	28(45)	17(48.5)			143(24.2)	95(78.5)	46(51)		
Separate / Divorced	14(2.3)	-	-			11(1.8)	19(15.7)	-		
Total family income (Rupees)										
10000-20000	102(16.9)	-	-			131(22.2)	-	-		
20000-30000	234(38.8)	10(16.1)	8(22.8)			190 (32.2)	19 (15.7)	7(7.7)		
30000-40000	124(20.5)	16(25.8)	1(2.8)			156 (26.4)	3 (2.4)	31(34.4)		
> 40000	104(17.2)	35(56.4)	25(71.4)			77(13.0)	82(67.8)	52(57.7)		
SES (Socio Economic status)										
Upper	85(14.0)	18(29.0)	10(28.5)	51.5	<0.0001*	41(6.9)	22(18.2)	31(34.4)	99.8	<0.0001*
Upper middle	170(28.1)	22(35.5)	11(31.4)			132(22.4)	41(33.9)	28(31.1)		
lower middle	193(32.0)	14(22.6)	6(17.1)			185(31.4)	36(29.8)	21(23.3)		
Upper lower	132(21.8)	-	8(22.8)			186(31.5)	16(13.2)	6(6.6)		
Lower	23(3.8)	8(12.9)	-			45(7.6)	6(5.0)	4(4.4)		

Table 3

Relationship of Overweight/Obesity with Genetic Factors

Variable	Group A					Group B				
	Eutrophic N(%)	Overweight N(%)	Obese N (%)	χ^2	p-value	Eutrophic N(%)	Overweight N(%)	Obese N(%)	χ^2	p-value
History of obesity in family										
Yes	24(4.0%)	35(56.5%)	35(100.0)	370.6	<0.0001*	51(8.6)	100(82)	73(81.1)	530.3	<0.0001*
No	579(96.0%)	27(43.5%)	-			538(91.3)	21(12)	17(18.8)		
Family members who are overweight/ obese										
Only Father	5(20.8)	8(22.8)	1(2.8)	835.3	<0.0001*	11(1.9)	11(9.1)	-	723.7	<0.0001*
Only Mother	13(54.1)	6(17.1)	6(17.1)			1(0.2)	9(7.4)	11(12.2)		
Both the parents	6(25)	15(42.8)	21(60.0)			36(6.1)	93(76.9)	37(41.1)		
Brother	-	3(8.5)	-			--	-	25(27.8)		
Sister	-	1(2.8)	7(22.9)			-	-	-		
Grandparents	-	2(5.7)	-			3(0.5)	8(6.6)	-		

Table 4

Relationship of Overweight/Obesity with Medical Factors

Variable	Group A					Group B				
	Eutrophic N(%)	Overweight N(%)	Obese N(%)	χ^2	P-value	Eutrophic N(%)	Overweight N(%)	Obese N(%)	χ^2	p-value

History of disease										
Hypothyroidism	-	10(16.1)	20(57.1)	554	<0.0001*	-	-	20(22.2)	468.5	<0.0001*
Arthritis/Gout	2(0.3)	-	-				3(2.7)	8(8.8)		
Diabetes	3(0.5)	-	-			20(6.6)	17(14.0)	31(34.4)		
Gall stones	-	-	13(37.1)			19	-	2(2.2)		
High BP	4(0.7)	-	2(5.7)			-	-	15(16.6)		
None	594(98.5)	52(83.9)	-			550(93.3)	101(83.4)	14(15.5)		

Table 5

Relationship of Obesity with Physical Activity

Physical Activity	Met-min	Group A					Group B				
		Eutrophic n(%)	Overweight n(%)	Obese n (%)	χ^2	P-value	Eutrophic n(%)	Overweight n (%)	Obese n(%)	χ^2	p-value
Low	<600	139(23)	28(45.2)	29 (82.8)	65.4	<0.0001*	22(3.7)	30(24.8)	60(65.9)	287.2	<0.0001*
Moderate	600-1200	385(63.8)	30(48.4)	5(14)			206(35.0)	50(41.3)	24(26.6)		
High	>1200	79(13.2)	4(6.5)	1(2.5)			361(61.3)	41(33.9)	6(6.6)		

Multinomial logistic regression analysis of factors associated with overweight and obesity: Multinomial logistic regression modeling was used to determine the association between socio-demographic, genetic, medical factors and overweight or obesity. The socio demographic characteristics of the studied population show that the odds of being overweight and obesity were significantly higher as age increased; the chance of being overweight (p=0.0001; OR: 3.01; CI: 2.60- 15.2) as well as obese (p=0.0001; OR: 3.74; CI: 5.49-18.49), was three times higher in the age range of 25-30 years compared to the reference age group i.e. 20-25 years. Moreover, women were almost twice as likely to be overweight (p=0.003; OR: 2.31, CI: 2.33–5.09), as well as obese than men (p=0.001; OR: 2.92; CI: 3.67-8.81). The odds of being overweight for individuals belonging to nuclear family was almost twice (p=0.048; OR: 2.04; CI: 1.00-4.13) and in case of obese was almost four times higher than individuals belonging to joint families (p=0.001; OR: 3.94; CI: 1.73-8.94). Marital status was not found to affect overweight (p=0.0001; OR: 0.93; CI: 0.36- 0.40) and obesity (p=0.0001; OR: 0.3; CI: 0.12- 0.11) much among the individuals in the present study as OR was <1 as compared to reference group of unmarried young adults. The risk of being overweight (p=0.0001; OR: 7.90; CI: 4.41- 26.72) and obese (p<0.01); OR: 8.9; CI: 1.67- 48.9) was significantly higher among those belonging to upper middle socio economic status in comparison with the reference group of respondents belonging to lower socio economic status. Our results also showed that the risk of both overweight and obesity increased significantly with a family history of obesity. Young adults with a family history of obesity had six times the odds of having overweight (p=0.0001; OR: 6.13; CI: 4.12- 9.13) and five times the odds of having obesity (p=0.0001; OR: 5.96; CI: 3.82- 9.30) compared to reference group of individuals without a family history of obesity. Individuals who practiced physical activity irregularly in terms of frequency or duration were seven times more likely to be obese (p=0.0001; OR: 7.107; CI: 2.99–20.6).

The results of the multinomial logistic regression thus revealed that the major significant predictor of obesity status was found to be upper middle socio economic status (OR: 8.9), followed by low

physical activity (OR: 7.1), genetic factors (OR: 5.9), nuclear family (OR: 3.9) and age (OR: 3.7).

Table 6

Multinomial Logistic Regression Analysis of Factors Associated with Overweight and Obesity

Factors	Overweight (N = 183)				Obese (N=125)			
	p-value	Odds Ratio	95% C.I.		p-value	Odds Ratio	95% C.I.	
		(OR)	Lower	Upper		(OR)	Lower	Upper
Age								
25-30	0.001*	3.01	2.60	15.21	0.0001*	3.74	5.49	18.4
20-25 (Reference)								
Sex								
Female	0.003*	2.31	2.33	5.09	0.001*	2.92	3.67	8.81
Male (Reference)								
Type of Family								
Nuclear	0.048*	2.040	1.006	4.137	0.001*	3.943	1.738	8.944
Joint (Reference)								
Marital status								
Married	0.0001*	0.93	0.36	0.40	0.0001*	0.35	0.12	0.11
Single (Reference)								
SES								
Upper	0.60	5.327	1.154	24.594	0.119	4.558	0.679	30.614
Upper middle	0.0001*	7.904	4.418	26.728	0.010*	8.931	1.672	48.986
Lower middle	0.003	9.426	2.099	42.324	0.252	3.716	0.392	35.190
Upper lower	0.898	0.919	0.252	3.355	0.056	5.858	0.955	35.924
Lower (Reference)								
Medical factors (Chronic diseases)								
Yes	0.0001*	0.37	0.11	0.41	0.003*	0.28	0.09	0.88
No (Reference)								
Genetic factors (history of obesity)								
Yes	0.0001*	6.13	4.12	9.13	0.0001*	5.96	3.82	9.30
No (Reference)								
Physical activity								
Low	0.0001*	0.64	0.20	1.32	0.0001*	7.107	2.997	20.670
High (Reference)								

Discussion

The purpose of this study was to estimate the prevalence of obesity and also to examine a wide range of factors that may be associated with obesity in young adults. The prevalence of overweight and obesity is already the focus of several studies. However, data on associations between some risk factors such as sociodemographic characteristics, health conditions, lifestyle, and overweight and obesity in Kashmiri population is still scarce. In the recent years a number of studies have been carried out to estimate the prevalence of obesity in adults. However, the present study is first of its kind to estimate the prevalence of obesity in younger age group of 20-30 years. The prevalence of obesity in the present study was observed to be slightly higher than

that reported by[13] among adults of North India (Kashmir valley, obesity i.e. 5.1%). The results of the present study are compared with adult populations of other regions of India to facilitate a relative evaluation. Studies from different parts of the country show a diverse scenario. One of the studies shows a high obesity prevalence in Assam i.e. 14.3 per cent[14]**.** Yet in another study done in Ludhiana, the prevalence of obesity was found to be 29.6 per cent[15]. [16] Showed obesity prevalence in Sonipat as 15.2 per cent. The reason for this difference of obesity prevalence in between our study and these studies is that higher age groups have been undertaken in most of the above mentioned studies, and people in the age group of 20-30 years are expected to be less overweight as compared to the higher age groups. The most important fact that is derived from our result is that the frequency of overweight/obesity among the studied youth population is still worrisome since obesity at such an early age can predispose these young adults to many lifestyle diseases in later stages of their life.

Overweight and obesity prevalence were higher in females compared to males. These findings were different from findings reported from a study done among students of the Belgrade University, Serbia by[17] and Lebanese university students by[18] which found high prevalence of overweight and obesity in males than females. This may be due to different factors such as life styles differences between males and females in this setting. Being female is highly associated with risk of overweight and obesity. This is because females tend to deposit more fats in their body especially during reproductive ages. This means therefore that females have high risk of being overweight and obese compared to males.

Age has been reported to be one of the determinants of overweight and obesity in different populations. In this study, results showed that as age advances the odds of being obese increases compared to lowest age. This finding is similar to that reported in a study done in Ghana among Urban women[19]. This similarity might be attributed to the fact that as an individual advances in age, fats content in the body increase due to reduced metabolic and physical activities. This is likely to be caused by less participation in physical activities (sedentary life style) leading to high accumulation of energy than that expended resulting in putting on more weight. This increases their likely chance of becoming overweight and obese. These findings also concur with a study done in India [20] which reported a significant association between age and risk of obesity. This implies that if measures to control overweight and obesity do not take into account of age structure of the population, the prevalence of overweight and obesity will continue.

With respect to marital status, results showed that married participants had high prevalence of overweight compared to unmarried participants outside universities. The effects of marriage and divorce on weight may be due to the influence of marriage on inducement to eat (e.g., shared meals) or on motivation for weight control as suggested[21]**.** These findings concur with those reported in a study done in Urban India among women based on economic stratum by[22] which found that being married was associated with an increased risk of overweight and obesity. This finding implies that being married is associated with increased risk of overweight and obesity. A significant association was found in between genetic factors and BMI in the present study as majority of overweight and obese were found to have a family history of obesity. Genes influences the number and size of fat cells, regional distribution of body fat, and resting metabolic rate also. Recent studies suggest that genetics determine 50 to 70 per cent of the predisposition to obesity with the discovery of more than 50 genes that are strongly associated with obesity[23]**.**

The current study indicated that the Prevalence of overweight and obesity was high in participants reported to engage in moderate physical activities compared to those reported to engage in vigorous physical activities when assessed using WHO's GPAQ method. Physical inactivity has also been reported to be associated with overweight and obesity by[24]**.** This is because individuals who do not perform physical activity regularly accumulates more energy in their body than the energy which they spend leading to weight gain. The findings of the present study showed overall physical inactivity to be 20 per cent. In the World Health Survey (WHS), the prevalence of physical inactivity in India was 18 per cent as has been revealed[25]**.** This figure is more or less similar to our findings. However, the WHS used the IPAQ (International Physical Activity Questionnaire), whereas in the present study we have used the GPAQ, which could account for some of the differences seen.

Conclusion

A dual burden of both adult underweight and having overweight or obesity was found in Srinagar City of Kashmir valley. Prevalence of overweight and obesity was associated with gender, marital status, genetic factors, monthly family income and socio economic status. All these factors emerged as major predictive variables which increases the likelihood of the high prevalence of excess adiposity (overweight and obesity) among young adults in district Srinagar of Kashmir.

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Challenges Encountered by Mothers of Physically Challenged Children in Practicing Self-Care

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Abstract

Parenting a child with physical limitations presents both rewarding and challenging experiences, affecting stress levels, parental psychological well-being, and parenting self-efficacy. Mothers often describe the experience as draining and upsetting, with potential consequences for their self-image as effective parents and their mental health. Based on the findings of Wenze & Battle (2018), it is evident that mothers of children with disabilities encounter obstacles when addressing their self-care needs. These challenges often arise from perceiving additional tasks as burdensome rather than supportive, prompting further investigation. Therefore, a study was conducted to explore the time expenditure patterns, challenges faced and self-care practices among 100 mothers of physically challenged children residing in Chennai city. Employing a structured questionnaire, the study revealed that a majority of these mothers' experience significant challenges such as limited time, lack of family and social support, and financial constraints. It is evident that many of these mothers require effective coping strategies to manage their stress and prioritize self-care. Supporting mothers of children with special needs can yield positive outcomes for the entire family. As part of the study's action plan, recommendations for self-care were provided to assist mothers in balancing and overcoming their stress.

Key words: Self Care, Strategies, Special Needs, Physical Disabilities, Parental Fatigue.

Introduction

The journey of motherhood is often marked by various challenges, yet there is typically a sense of relief as children grow older and become more independent, gradually lessening the demands on a mother's time. Milestones such as toddlers learning to feed themselves and becoming potty trained, or children going off to school and taking on responsibilities, provide moments of respite for many mothers. However, for mothers of children with disabilities, these challenges and demands often persist intensely. The needs of disabled children are diverse and individualized, with varying levels of support required that may evolve over time. Generally, the needs of disabled children exceed those of their non-disabled peers, contributing significantly to parental stress and associated physical and mental health issues. Moreover, these high levels of need can endure throughout the lives of disabled individuals.

In addition to the existing stress and challenges, modern portrayals of motherhood in the media often exacerbate pressure on mothers to adhere to unrealistic standards. Mothers are frequently exposed to and influenced by the portrayal of celebrity supermoms, idealized images of "perfect" motherhood on social media platforms, and the phenomenon known as the "Mommy Wars," characterized by competitive attitudes among mothers where any parenting decision is subject to criticism from peers, family members, and even strangers.

Parents need to prioritize their own well-being to prevent burnout, which includes ensuring they get enough rest, exercise regularly, stay hydrated, and carve out time for themselves. While some parents may feel they must manage everything alone, seeking support from others is vital. Spending time with friends, participating in support groups, or simply scheduling leisure activities can all have positive effects. A British study suggests that chronic stress places these parents at risk of health issues. The study found significantly higher levels of the stress hormone cortisol and the biomarker CRP in parents of children with autism or ADHD. CRP has been linked to various health conditions, including colorectal cancer, diabetes, and heart disease. It is crucial to address the physical and emotional risks that caregivers of challenging children face, for the sake of both the children and the parents themselves. In the following section, we explore common causes of caregiver stress and provide advice for parents on how to maintain their physical health, emotional well-being, and commitment to their children.

Strategies that Help in Self-Care

Experts concur that challenging the notion that the only one who can help them is themselves and that there is no end to the amount of work one need to perform is a key component in preventing or lessening burnout. Allocating time for hobbies or enjoyable activities at least once a week can be beneficial, along with practicing self-observation and spending ten minutes daily on mindfulness exercises. Taking breaks is also highly recommended, and hiring help such as cleaners or gardeners can alleviate some of the workload. Connecting with others for support is crucial, as is advocating for breaks and joining support groups. Prioritizing self-care is important not only for mothers' self-esteem but also for their mental health and children's well-being, including exercise and healthy eating. Additionally, visiting uplifting places can serve as a distraction. This study aims to evaluate the efficacy of these approaches among mothers of physically challenged children and recommend their adoption.

Objectives

The objectives of this study is to

- find out the Socio demography profile of the selected respondents,
- investigate the time expenditure patterns of the selected respondents,
- identify the challenges faced by mothers of physically challenged children,
- examine the self-care practices employed by mothers in managing their well-being, and
- suggest recommendations for self-care strategies tailored to the needs of mothers caring physically challenged children.

Methodology

Research Design: The research design employed for this study was an Expost-facto research design, which involves collecting data at a single point in time to explore the time allocation patterns, difficulties encountered by mothers of physically challenged children, and the self-care strategies they utilize to maintain their own well-being. This approach allows for an examination of these factors retrospectively, providing insights into the experiences of the participants within the specified timeframe.

Sampling Design: For this study, a purposive sampling approach was employed. This method involves deliberate selection of sample items by the researcher, with the researcher's discretion guiding the selection process. As described by Kothari (2004), in purposive sampling, the researcher intentionally chooses specific units from the population to form the sample. Utilizing this technique, the study focused exclusively on mothers of physically challenged children between the ages of 5 and 20 who reside in Chennai city. Participation in the study was voluntary, and only those mothers who expressed willingness to take part were selected.

Sample Size: A study was conducted in Chennai city, focusing on a sample of one hundred mothers with physically challenged children. Participation in the survey was voluntary, and data collection commenced only after obtaining consent. Additionally, the participants received guidance on self-care strategies tailored to address both their own needs and those of their physically challenged children.

Tools Used for Assessment: Data collected through structured questionnaires administered to the participants. The questionnaire includes sections addressing time expenditure patterns, social support networks, challenges faced, and self-care practices. Pilot study was conducted to test reliability and validity of the tool. Data was analysed using percentage analysis.

Analysis of Data: The analysis of data is made using frequency distribution.

Findings and Discussion

Demographic Profile of the Selected Respondents: This aspect includes the age, educational qualification, marital status, employment status, family income, number of children in family, number of physical challenged children, age(s) of physically challenged and type of disability children is depicted in Table 1.

Table 1

Demographic Profile of the Selected Respondents

Demographic Profile		Percentage (N=100)
Age	21-30 Years	38
	31-40 Years	32
	41-50 Years	30
Education Qualification	High School	43
	Graduate	34

	Professional	23
Marital Status	Living with Husband	78
	Divorced	12
	Widowed	10
Employment Status	Employed Full-time	12
	Employed Part-time	31
	Unemployed	23
	Homemaker	34
Family Income (Monthly)	Below Rs. 25,000/-	45
	Rs.25,000/- – Rs.50,000/-	38
	Above Rs.50,000/-	16
No. of Children in family	One – Two	52
	Three – Four	45
	Above Four	3
No. of Physically Challenged Children	One	93
	Two	7
Age(s) of Physically Challenged Children	(5- 10 Years)	29
	(11-15 Years)	48
	(15-20 Years)	23
Type of Disability	Mobility Impairments	20
	Orthopedic Disabilities	15
	Neurological Disorder	8
	Sensory Impairments	43
	Chronic Health Conditions	4
	Developmental Disabilities	10

It is clear from the above table that majority of respondents were aged between 21-30 years (38 per cent) had completed high school (43%), were married and living with their husbands (78%), and the highest proportion were homemakers (34%). Families predominantly have a monthly income below Rs. 25,000/- (45%) with one to two children (52%). Among these families, 93 per cent have one physically challenged child (93%), aged 11-15 years (48%) with sensory impairments being the most prevalent disability type of disability (43%).

Time Spent by Mothers for Childrens' Activities: Table 2 presents the time expenditure on selected activities among mothers of physically challenged children, categorized by different time intervals ranging from nil to more than 5 hours.

The data reveal that the majority of mothers of physically challenged children predominantly spend their time on household chores, preparing meals (73 per cent) and children studies/care

giving activities (64 per cent) for more than 5 hours daily, illustrating a significant workload in managing domestic tasks. Furthermore, a considerable proportion (46 per cent) dedicate 1-3 hours commuting to healthcare appointments for their children, underscoring the challenges in accessing necessary medical care. Despite limited personal leisure time, a notable proportion (52 per cent) allocate 1-3 hours to engage in community or support group activities, emphasizing the value of social support networks. However, alarmingly, the majority of mothers (82 per cent) reported spending no time on self-care activities, indicating a concerning neglect of their own well-being amidst caregiving responsibilities followed by no time socializing with friends or family (36 percent) and no time to engage in recreational activities for personal enjoyment (12 per cent). These findings underscore the urgent need for interventions to support mothers in managing their caregiving duties while prioritizing their own health and well-being, fostering social connections, and promoting opportunities for rest and relaxation. Raina et al., (2005) and Keller & Honig, (2004) reported that caregivers of children with disabilities often experience high levels of stress and time constraints. Studies have shown that these caregivers frequently prioritize the needs of their children over their own, leading to burnout and neglect of personal.

Table 2

Time Expenditure on Selected Activities

Details	No time	Less than 1 hour	1-3 hours	3-5 hours	More than 5 hours
Time spent on children studies/ care giving activities.	-	7	10	19	64
Time spent on household chores and preparing meals.	-	-	7	20	73
Time spent on daily living activates of child (bathing, dressing)	-	93	7	-	-
Time spent for to and from medical appointments or therapy	-	23	46	31	-
Time spent for recreational activities for personal enjoyment	12	80	8	-	-
time spend on socializing with friends or family members	36	64	-	-	-
Time allocate for self-care activities, such as exercise, relaxation, or pursuing personal interests	82	18	-	-	-
Time spent on engaging in community or support group activities related to your child's disability	31	52	17	-	-
Time allocate for personal rest or relaxation	67	33	-	-	-
Time spent on own healthcare needs (Medical appointments, therapy)	59	41	-	-	-

Details of Self-Care Practices: Table 3 presents the insights into the self-care activities prioritized by mothers of physically challenged children and the figure 1 illustrates the frequency of engagement in self-care activities.

The most commonly prioritized activities include listening to music or podcasts (95 %), indulging in favorite leisure activities (85 %), spending time with friends or family (64 %), participating in support groups or online communities (63 per cent), and practicing gratitude or positive affirmations (56 %). Conversely, activities such as meditation or mindfulness practices (20 per

cent) and relaxation techniques (12 %) were less commonly prioritized. These findings highlight the diverse range of self-care strategies adopted by mothers, emphasizing the importance of tailoring interventions to individual preferences and needs. Additionally, the relatively low prioritization of certain activities underscores potential areas for targeted support and encouragement to promote holistic well-being among mothers of physically challenged children. According to Zeman et al.[1], engaging in enjoyable leisure activities, including listening to music, is a common strategy for managing stress among caregivers. Music therapy has been shown to significantly reduce stress and improve mood in caregivers[2].

Table 3

Prioritize of Self-care Activities*

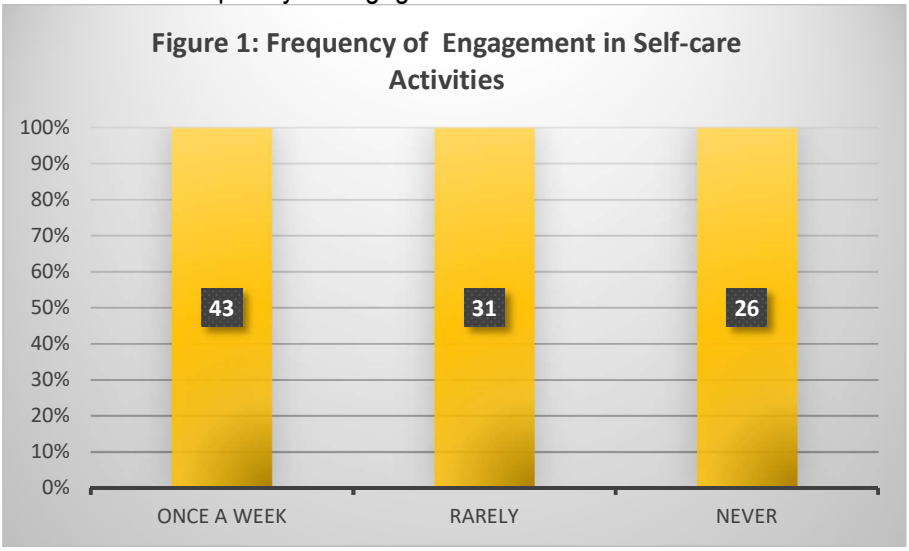
Prioritize of Self-care activities*	Percentage
Exercise (walking, jogging)	23
Meditation or mindfulness practices	20
Hobbies or creative activities (painting, gardening, cooking)	59
Spending time with friends or family	64
Relaxation techniques (e.g., deep breathing, yoga)	12
Seeking professional support (e.g., therapy, counseling)	26
Listening to music or podcasts	95
Indulging in a favorite leisure activity (e.g., reading, watching movies)	85
Getting enough sleep and rest	32
Practicing gratitude or positive affirmations	56
Taking time for self-reflection or journaling	41
Participating in support groups or online communities	63
Taking breaks from technology or social media	46
Going for nature walks or spending time outdoors	21
Engaging in acts of self-care, such as pampering oneself with a bath, massage, or spa treatment	12

*Indicates data exceeds 100 because of multiple responses

Frequency of Engagement in Self-care Activities: Figure 1 illustrates the frequency of mothers engage in self-care activities, categorized into three distinct intervals: "Once a Week," "Rarely," and "Never." Each category's engagement frequency is represented as a percentage.

The majority of respondents reported engaging in self-care activities once a week (43 %), indicating that nearly half of the mothers manage to incorporate some form of self-care into their routine, which is a positive sign of attempting to balance caregiving responsibilities with personal well-being. However smaller percentages indicated engaging in self-care rarely (31 %) due to time constraints or other factors. Alarmingly, a significant portion reported never (26 %) engaging in self-care activities were mothers completely neglect their self-care, which can have significant negative impacts on their physical and mental health. These findings underscore the need for interventions to promote regular and consistent self-care practices among mothers of physically challenged children, as neglecting self-care can adversely affect maternal well-being and resilience.

Figure 1
Frequency of Engagement in Self-care Activities



Family Support in House Hold Activities

Table 4 illustrates the distribution of family support among mothers of physically challenged children across various household activities.

Table 4
Family Support in House Hold Activities (%)

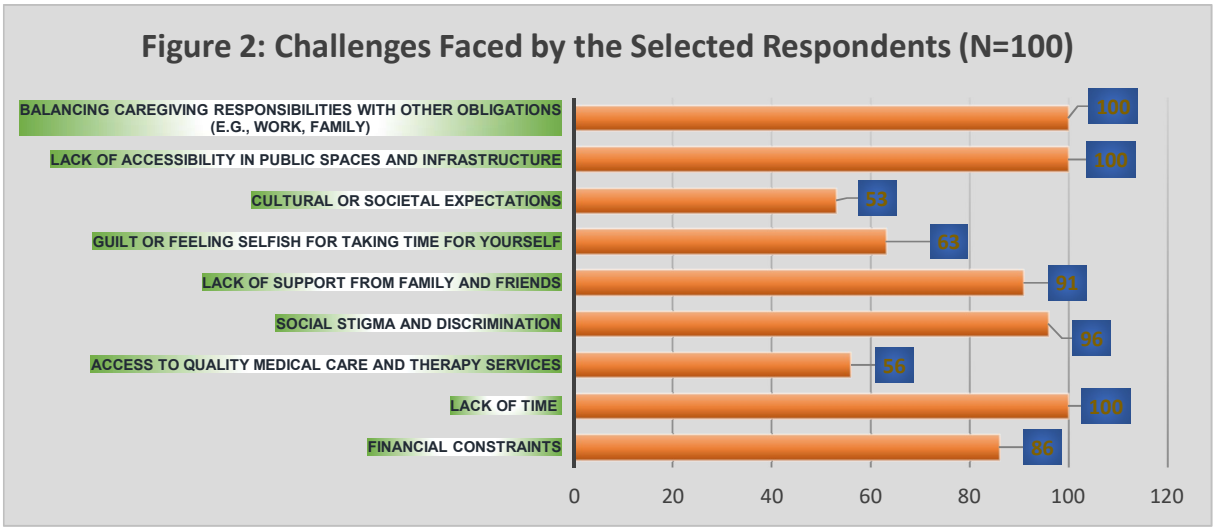
Family Support in House Hold Activities	Self	Spouse	Grand Parent	In-Laws	Paid help
Cooking/Cleaning Vessels	55	7	3	8	27
Washing, Ironing & Folding Clothes	60	10	5	-	25
Mopping Floor	60	-	15	3	22
Spending time with my child in telling or hearing story	60	15	10	5	10
Making children get ready to school & Leave them to school	55	10	12	8	15
Helping children in school work/home work	58	8	15	5	14
Buying Vegetables/Provisions	50	12	18	8	12
Bathing, dressing and feeding child	65	7	10	5	13

The above table indicates that the majority of mothers rely on themselves on different tasks, with bathing, dressing, and feeding the child seeing significant support from mothers themselves (65 %) while others depend on paid help (13 %), grandparents (10 %), spouse (7 %) and in-laws.

It was noted that sixty per cent of the mothers rely on themselves for washing, ironing & folding clothes, mopping floor and spending time with their child by telling or hearing story followed by making children get ready for school and leaving them at school and cooking/cleaning vessels (55 %). Spousal support is notable in activities like spending time with the child (15 %) followed by buying vegetables/provisions (12 %), washing, ironing & folding clothes & making children get

ready for school and leave them and helping with school work/homework (8 per cent). It was notes that most of the mothers depend on paid help for cooking/cleaning vessels (27 per cent), washing, ironing and folding clothes (25 %), mopping floor (22 %), making children ready to school and leaving them at school (15 %), helping children in school work/home work (14 per cent) and bathing, dressing and feeding child (13 %). Marks et al.[4] study found that many families of children with disabilities rely on paid help for various household and caregiving tasks. This reliance is often due to the overwhelming nature of caregiving responsibilities which necessitates external support.

Challenges Faced by the Mothers of a Physically Challenged Child: The figure 2 illustrates the primary challenges faced by the mothers of physically challenged children in Chennai from practicing self-care regularly.



*Total exceeds 100 due to multiple response

It was noted that cent per cent of the mothers faced challenges related to a lack of time, balancing caregiving responsibilities with other obligations and lack of accessibility in public spaces and infrastructure followed by social stigma and discrimination (96 %), lack of support from family or friends (91 %), financial constraints (86 per cent) emphasizing the impact of economic limitations on accessing self-care resources, feelings of guilt or selfishness, reported by 63 per cent of respondents, highlighting the internal challenges in prioritizing personal well-being. Additionally, access to quality medical care and therapy services (56 %) and cultural or societal expectations (53 %) reveal the influence of cultural norms on self-care practices. These findings underscore the complex interplay of personal, social, and economic factors shaping the self-care behaviors of mothers caring for physically challenged children in Chennai. Brehaut et al.[5] study found that parents of children with special health care needs often struggle with time constraints and balancing caregiving with other responsibilities, leading to high levels of stress and burnout, social support from family and friends is crucial for caregivers' mental health, and the lack of such support can lead to increased caregiver burden[6].

Here are the suggestions for mothers of physically challenged children to practice self-care, this aim to empower mothers of physically challenged children to prioritize their own well-being amidst their caregiving responsibilities. By implementing these suggestions, support systems can be enhanced to better meet the self-care needs of mothers caring for physically challenged children, promoting their resilience, health, and overall quality of life.

Conclusion and Recommendations

The study provides insights into the challenges encountered by mothers of physically challenged children in practicing self-care, along with suggestions for enhancing support structures tailored to their needs. Findings indicate that while mothers dedicate significant time to caregiving and household responsibilities, they often neglect their own well-being, with a majority reporting no time spent on self-care activities. Lack of time, support from family or friends, financial constraints, feelings of guilt or selfishness, and cultural/societal expectations are identified as significant barriers to regular self-care. Additionally, the distribution of family support in household activities highlights the prominent role of mothers themselves, with spousal support noted in certain caregiving tasks.

When given the chance, taking a day or an hour to one self can help to rekindle the relationships in one's life. One of the main barriers to hiring a respite service is that parents frequently feel anxious or guilty about leaving their child unattended. Finding time to dedicate to mothers of disabled child might be challenging. But even just five to ten minutes a day will help them feel better all day long. One can handle stress and stay in the present moment by practicing mindfulness. Starting the day with some peaceful reflection and thought-gathering can help mothers and their child has a fulfilling day. A quick guided meditation that aligns with interests and principles can frequently be used to begin with when it can be intimidating to start meditating on their own. Tailored self-care plans, incorporating mindfulness techniques and seeking support from peers, are recommended to address the identified challenges. Respite care services, flexible work arrangements, and access to counseling are also proposed to alleviate the burden on mothers. By implementing these suggestions, support systems can be enhanced to better meet the self-care needs of mothers, promoting their resilience, health, and overall quality of life amidst the challenges of caring for physically challenged children. Future is unpredictable for everyone, it's time to understand the faces of reality and lead a better life than that of yesterday.

The authors suggest the following recommendations for mothers of physically challenged children to enhance the support structures tailored to their needs:

- Develop personalized self-care plans tailored to your needs, preferences, and circumstances.
- Incorporate mindfulness and stress reduction techniques such as meditation and deep breathing exercises into your daily routine
- Seek support from other caregivers facing similar challenges through support groups, online forums, or peer mentoring programs
- Advocate for respite care services to provide temporary relief and allow you to focus on your own well-being

- Explore flexible work arrangements or accommodations to better balance caregiving responsibilities with work commitments
- Ensure access to counseling and therapy services to address any emotional challenges or burnout related to caregiving
- Engage in community activities and recreational pursuits that bring you joy and fulfillment outside of your caregiving role
- Prioritize nutrition and physical activity to maintain your energy levels and overall well-being
- Learn effective time management strategies and set boundaries to protect your own needs and priorities
- It would be more helpful to study the availability of support networks and the extent to which mothers are able to engage in self-care activities.

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Catalyzing the Digital Health Revolution in India

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Abstract

Technology is being leveraged worldwide to deliver services to citizens in all domains, including healthcare. In reaction to India's growing need for healthcare digitalization, the government has launched the Ayushman Bharat Digital Mission Program, which aims to provide digital healthcare services to citizens. The Ayushman Bharat Digital Mission-ABDM (earlier known as National Digital Health Mission) was launched with a vision to create a national digital health ecosystem that supports Universal Health Coverage in an efficient, accessible, inclusive, affordable, timely, and safe manner. ABDM aims to create longitudinal electronic health records across the health spectrum for citizens, make healthcare accessible for citizens, reduce the cost of care and enable greater efficiencies in health service delivery. The digital health ecosystem created by ABDM supports seamless continuity of care across primary, secondary, and tertiary healthcare. Against the backdrop of the country's commitment to sustainable development, this paper explores the transformative potential of ABDM in shaping the future of healthcare in India and the paper also focuses on the implementation challenges faced by the country. An important component of the Ayushman Bharat Digital Mission (ABDM) being carried out in India is the Ayushman Bharat Health Account (ABHA), which is the focus of this study. To facilitate remote consultations and treatments, centralized health data can help advance telehealth by giving medical professionals access to patient medical records. An integrated understanding of healthcare delivery in India is necessary to investigate the role of the Ayushman Bharat Health Account (ABHA) in telehealth for sustainable development.

Key words: *Ayushman* Bharat Digital Mission, digital healthcare, health ID, ABHA, Universal Health Coverage.

Introduction

The expansion of the health sector from primary to tertiary levels initiates a sequence of socio-economic progressions: lowering disease burdens, enhancing health outcomes, reducing out-of-pocket healthcare expenses, and decreasing poverty rates. Investments in healthcare have a cascading influence on an economy's growth. The most effective indicators of population well-being and the development of human resources—which are crucial to human capability—are good health and adequate nutrition. India continues to fall behind in a number of areas, including the infant mortality rate, the proportion of the population suffering from anaemia, various health indicators, and the availability of essential services, even after 77 years of independence. The lack of financial health security, particularly for the impoverished and vulnerable segments of rural India, places a considerable strain on them due to healthcare expenses. Meanwhile, the

escalating costs of private healthcare have made their services almost unattainable for the average individual. Given these obstacles, the Indian government has done a fantastic job of enlisting the private sector to help provide accessible healthcare. By integrating private hospitals within the program, it has consciously made sure that everyone has access to multispecialty healthcare infrastructure and services. As suggested by the National Health Policy of 2017, the Central government started *Ayushman* Bharat in 2018 with the main goal of "*Sabka Saath Sabka Vikas*" to realize the vision of Universal Health Coverage.

The World Health Organization defines Universal Healthcare as ensuring that everyone can access much-needed quality health services (including preventive, curative, rehabilitative and palliative care) without facing financial hardship. This overarching goal encompasses several key objectives and benefits such as equitable access, financial protection, comprehensive care, enhanced productivity and economic development and so on. To achieve universal health coverage targets, the Indian government unveiled *Ayushman* Bharat on September 23, 2018. The formulation and implementation of this policy is based on the recommendations of the national health policy. This program gives needy and vulnerable families financial assistance for medical expenses. Several individuals in a specific demographic group had their living conditions improved by the program. Primary, tertiary, and secondary medical care are all included in universal healthcare, which offers free medical treatment. Australia is one of the few countries that has fully embraced universal healthcare, while the United States, the United Kingdom, Canada, Sweden, and India are still in the early stages of the programme.

The health care delivery system in India is evolving, to keep up with the pace of the era of digitalization. Telemedicine platforms are now established in both private and public health sectors[1]. Digital health is described as the integration of information technology and electronic communications used for different healthcare processes for overall people's health and their wellbeing. Information and Communication Technologies (ICTs) are acknowledged as vital tools to strengthen Primary Health Care (PHC) in low- and middle-income countries (LMICs)[2,3].

Objectives

The objectives of this paper is to

i. Analyze the key components and objectives of the ABDM, and
ii. Evaluate the implementation strategies and challenges.

Ayushman Bharat Digital Mission-ABDM

The term "digital health" refers to a broader category that includes using information, communication, and electronic technology to improve and deliver healthcare[4] in order to establish a national digital health ecosystem that supports universal health coverage in an efficient, accessible, inclusive, affordable, timely and safe manner, This ecosystem will offer a variety of data, information, and infrastructure services, appropriately utilizing open, interoperable, standards-based digital systems, and guarantee the security, confidentiality, and privacy of personal health information. India is endeavouring to create a digital health system that will benefit all of its residents, transforming healthcare in the nation[5].

On September 27, 2021, the Prime Minister officially launched the *Ayushman* Bharat Digital Mission (ABDM) through video conference. Among the dignitaries in attendance were Shri Mansukh Mandaviya, Union Minister of Health and Family Welfare, and Dr. Bharati Pravin Pawar, Minister of State for Health and Family Welfare. Hospitals around the nation's digital health solutions will be connected under the *Ayushman* Bharat Digital Mission. The Mission would not only facilitate living conditions but also enhance hospital operations. Other services like digital consultation and patient consent for medical professionals to view their records will also be made possible by the digital ecosystem. Due to the digital storage of all records, this approach ensures that historical medical records never disappear. The National Health Authority (NHA) will be the implementing agency of *Ayushman* Bharat Digital Mission (ABDM). With the help of this program, people living in remote or rural locations will be able to easily access healthcare services through telemedicine, and professionals will have an easy-to-use platform to review patient data, improving diagnosis and treatment[6].

The goals of ABDM are to lower healthcare costs, increase access to healthcare, let citizens create longitudinal electronic health records throughout the health spectrum, and facilitate more efficient delivery of health services. Effective healthcare management techniques are the greatest way to overcome the obstacles in achieving the objective of providing everyone with high-quality healthcare and have demonstrated significant potential in doing so[7]. The seamless provision of primary, secondary, and tertiary healthcare is made possible by the digital health ecosystem developed by ABDM. By using electronic methods, it guarantees the accessibility of medical services, especially in isolated and rural locations where access to specialized care may be limited. To improve the equity and accessibility of health services, including a continuum of care where citizens own their data, through a comprehensive healthcare program that makes use of IT and related technologies, and to complement the current health systems by adopting a "citizen-centric" approach, the *Ayushman* Bharat Digital Mission (ABDM) envisions the following particular goals:

- Establishing leading-edge digital health systems, managing the essential data, and setting up the infrastructure needed to provide smooth data sharing;
- The aim is to produce a unified source of truth for clinical facilities, healthcare professionals, health workers, medications, and pharmacies by establishing registries at the appropriate level.
- The aim is to mandate that all national parties involved in digital health embrace open standards.
- To establish a readily available system of personal health records, compliant with international standards, for persons, healthcare providers, and professionals, based on the informed consent of the individual;
- To encourage the creation of enterprise-class health application systems, with an emphasis on reaching the health-related Sustainable Development Goals;
- To cooperate with the States and Union Territories to realize the objective while embracing the best cooperative federalism principles;
- To assure that private healthcare providers and institutions actively collaborate with public health authorities to develop the *Ayushman* Bharat Digital Mission (ABDM) by utilizing a blend of promotion and prescription;

- Utilizing medical research and health data analytics, to encourage improved health sector administration;
- The aim is to enhance the current health information systems by verifying their adherence to established guidelines and incorporating them with the *Ayushman* Bharat Digital Mission (ABDM).

Key Components of the Ayushman Bharat Digital Mission

With the *Ayushman* Bharat Digital Mission (ABDM), the nation's integrated digital health infrastructure will have the foundation it needs to grow. *Ayushman* Bharat Digital Mission (ABDM) envisages to develop the backbone necessary to support the integrated digital health infrastructure of the country. The digital health ecosystem created by ABDM supports continuity of care across primary, secondary and tertiary healthcare in a seamless manner[8]. The Health Professional Registry (HPR), Health Facility Registry (HFR), *Ayushman* Bharat Health Account (ABHA) for people, and ABHA Application are the main tenets of the mission. Across primary, secondary, and tertiary healthcare, the digital health ecosystem developed by ABDM facilitates seamless continuity of care.

Health ID Creation: A cornerstone of the ABDM is the creation of a unique Health ID for every citizen. This ID serves as a digital identifier, enabling individuals to access and share their health records across healthcare providers. The Health ID is expected to empower patients by giving them control over their health data; and facilitating better-informed decisions regarding their care.

Digital Health Records: The ABDM facilitates the creation and linking of digital health records to an individual's Health ID. This system ensures that patients' medical histories are available when needed, reducing the risk of errors, improving the quality of care, and enhancing the continuity of care across different healthcare settings.

Healthcare Professionals Registry (HPR): The HPR is a comprehensive directory of healthcare professionals across India. This registry allows patients to verify the credentials of healthcare providers, fostering transparency and trust in the healthcare system. The HPR also serves as a resource for healthcare facilities to recruit qualified professionals.

Health Facility Registry (HFR): The HFR is a centralized database of healthcare facilities, including hospitals, clinics, and laboratories. This registry provides detailed information about the services offered by each facility, facilitating better patient decision-making and ensuring that healthcare resources are optimally utilized.

Personal Health Records (PHR): The PHR system under the ABDM allows individuals to manage their health data in a secure environment. Patients can decide who has access to their records, ensuring that their privacy is protected while enabling better-coordinated care.

Integration with Telemedicine and E-Pharmacy Platforms: Recognizing the growing importance of remote healthcare services, the ABDM integrates telemedicine and e-pharmacy platforms. This integration ensures that patients, especially in rural and underserved areas, have

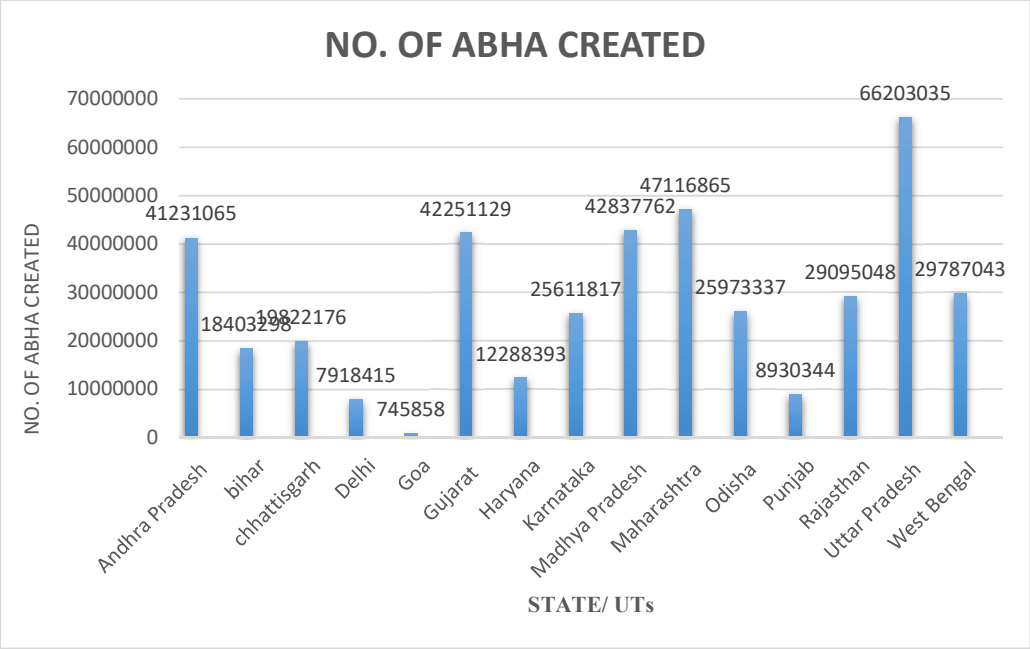
access to consultations and medications without the need to travel long distances (The Lancet,2019)

Interoperability and Data Exchange: Interoperability is a critical aspect of the ABDM, ensuring that different digital systems used by healthcare providers can communicate with each other. This capability allows for seamless data exchange, reducing redundancies, and improving the efficiency of healthcare delivery.

Ayushman Bharat Digital Mission (ABDM) building blocks may be established on a solid base thanks to the current robust public digital infrastructure, which includes the Aadhaar, Unified Payments Interface, and widespread Internet and mobile phone usage (JAM trinity). Simplifying healthcare information through digital management is made possible by the current capabilities to digitally identify patients, physicians, and healthcare facilities; enable electronic signatures; guarantee non-repudiable contracts; process paperless payments; securely store digital records; and communicate with individuals. The Ayushman Bharat Digital Mission includes the *Ayushman* Bharat Health Account (ABHA), sometimes referred to as the health ID project.

Ayushman Bharat Health Account (ABHA) numbers, formerly known as Health IDs, are generated in order to guarantee citizen participation. The 14-digit ABHA, or Unique Health Identifier, can be obtained either digitally or as a printed copy. Table No. 1 demonstrates that ABHA has been established for the inhabitants of numerous states. According to data, the state of Uttar Pradesh created the most ABHA (66203035), followed by Madhya Pradesh and Maharashtra. The state of Goa created the fewest ABHA (745858), followed by Delhi.

The numbers off ABHA created in various States/UTs are presented in the following graph.



Source: https://pib.gov.in

Challenges Ahead in the Implementation of ABDM: Though the application of digital health technologies enables efficient health service delivery and hastens the progress towards achieving UHC, multiple challenges exist for the successful implementation of digital health initiatives

One of the significant challenges in implementing the ABDM is the inadequate digital infrastructure, particularly in rural areas. Limited internet connectivity and lack of access to digital devices can hinder the adoption of digital health services. As of 2020, only 12 per cent of Primary Health Centres (PHCs) in India were equipped with computers, and only 8 per cent had internet connectivity[9]. Secondly, the digitization of health records raises concerns about data privacy and security. information Adopting any digital strategy requires careful consideration of privacy and security issues, which are always major challenges. Because digital healthcare contains patients' sensitive and personal information, it must be particularly strong in protecting patient privacy[10]. Ensuring that health data is protected from unauthorized access and breaches is critical to maintaining public trust in the ABDM. Robust data protection laws and regulations are necessary to address these concerns. According to a report, In the year 2023, the Indian Computer Emergency Response Team (CERT-In) handled 15,92,917 cybersecurity incidents a significant increase from previous years[11]. Further, Healthcare providers and patients may be resistant to adopting new digital tools due to a lack of familiarity or fear of technology. Addressing this resistance through education and awareness campaigns is crucial for the success of the ABDM. Furthermore, achieving interoperability between different digital systems requires the standardization of data formats, protocols, and procedures. The lack of standardization can lead to fragmentation and inefficiencies in the digital health ecosystem. A study conducted by the National Health Authority (NHA) in 2021 revealed that only 30 per cent of private hospitals in India had implemented Electronic Health Records (EHR) systems, and even among those, the systems were often not interoperable with each other or with public health systems (National Health Authority, 2021). Though the states have taken a huge interest in creation of the health IDs but non-linking health records with these IDs is not allowing the stakeholders, including the patients, to reap the benefits of digital health records.

Conclusion and Suggestions

To combat the challenges faced by the ABDM in successful implementation several suggestions are here; Focusing on specific stakeholders, creating a conducive policy environment, and promoting effective utilization of digital services can significantly help ABDM in India to succeed. Improved and easier access to healthcare services, better communication between patients and providers, and improved quality of care due to data availability and analysis. Further, Develop AI-powered tools for personalized health recommendations, disease prediction, and preventive care management, increasing the perceived value of ABDM for individual health. Furthermore, Integrated telemedicine consultations and remote monitoring functionaries within ABDM, make healthcare accessible even in remote areas or for patients with mobility limitations. Empowering and strengthening the healthcare systems of individual states and union territories can be a powerful driver for ABDM adoption in India.

The use of ABDM in healthcare delivery has great potential. With applications in practically every stage of initiation, implementation, and evaluation, digital health technologies have a wide range

of applications. This is due in part to the awareness of the significance of conductive environments in the context of India's ABP and the potential of these technologies to enable UHC. In order to improve the overall efficiency of India's health system, digital technologies will spread more quickly under a conducive regulatory framework with financial investments and incentives. The provision of higher-quality clinical services needs to be the primary goal, rather than just the implementation of an IT system. To fully reap the potential benefits of the mission, the clinical protocols, organizational cultures, and administrative workflows must be modified as needed. In India, digital health is anticipated to be the main pillar that influences care models, provides value-based services across the healthcare continuum, and has a ripple effect on all ecosystem players. The *Ayushman* Bharat Digital Mission represents a significant step towards transforming India's healthcare system. By leveraging digital technologies, the ABDM aims to create a more accessible, efficient, and patient-centric healthcare ecosystem. While there are challenges to be addressed, the potential benefits of the ABDM are substantial, offering a path towards universal health coverage and improved health outcomes for all Indians.

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Buffering Economic Impact of Health Shocks among the Elderly: Patterning the Access to and Determinants of Health Insurance in Haryana

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Abstract

The study explores how health insurance determinants and access can mitigate the financial effects of health shocks among senior citizens in Haryana. The research attempts to improve healthcare coverage and financial protection for the region's senior population through a thorough investigation. The study aims to examine the factors that determine health insurance accessibility and how they affect seniors' financial security by looking into patterns of healthcare coverage availability and pinpointing the reasons for coverage gaps. Data from 441 elderly people and their households were gathered using a multi-stage stratified systematic sampling technique. The research highlights the intricacy of variables impacting older citizens' access to and use of health insurance in Haryana, providing important information that can guide policies and interventions to raise coverage rates and protect the elderly from financial hardships during medical emergencies.

Key words: Health insurance access, Elderly healthcare coverage, Socioeconomic factors, Insurance disparities, Financial protection, Policy interventions.

Introduction

In the rapidly ageing society of Haryana, the elderly people are increasingly vulnerable to health shocks— unexpected medical events that can potentially cause economic turmoil for individuals and their families. The financial effects of health-related problems may be quite significant, particularly in settings with direct fee-for-service healthcare systems. In such unexpected situations, health insurance becomes a safety net against the financial strain. Nevertheless, in Haryana, various factors affect the consistency and availability of this service.

Among seniors especially, health insurance is now recognized as necessary for reducing the financial impact of sudden medical expenses or other health emergencies. However, there remain disparities within coverage rates; these differences correspond with specific social-economic and demographic characteristics unique to each setting studied herein. Understanding current patterns in elderly care insurance accessibility across different populations can foster inclusivity while safeguarding individuals from financial ruin at old age.

Haryana is a state in Northern India undergoing a demographic transition characterized by declining fertility rates and increased life expectancy. As per the Census of India[1], the number of old people in Haryana is increasing rapidly, which is a matter of concern for their healthcare,

social security system and economic welfare. The elderly population of this region has different health requirements as well as financial conditions and accessibility to medical facilities too.

A sudden serious illness or injury that leads to hospitalization and a high cost of treatment causing a great impact on the senior citizens' finances is called a health shock. The research undertaken by Garg et al.[2] reveals that health shocks affect older people unequally, with those who earn less or have no health coverage being more vulnerable to financial strain. Health shocks not only erode households' savings but also interrupt income-generating activities thereby deepening poverty levels among aged persons.

Health insurance is crucial in shielding elderly individuals against economic hardships resulting from healthcare emergencies in Haryana. This implies that medical cover should cater for all costs incurred during treatment thus relieving patients or their families from paying hospital bills. It is imperative to note that this can ensure immediate access to critical medical care without a person incurring huge personal costs. Furthermore, the incidence of health insurance cover may increase the utilization of health amenities besides encourage preventive measures for the elderly thus, improved healthcare can lead to better health outcomes, and as a result, a better quality of life.

However, older people in Haryana face many difficulties when it comes to getting themselves insured against illness or injury. Sharma and Singh[3] found out that a person's socioeconomic status, level of education and where they reside are among the things that determine whether or not he/she will have access to health insurance during old age. Besides being disadvantaged by poverty in addition to living far away from hospitals which offer such services; some senior citizens also lack awareness about them due to their limited knowledge of how systems work while others find them unaffordable because there are many bureaucratic processes involved before one is allowed sign up for any policy.

Understanding why certain factors exist which affect the availability/use of healthcare coverage among older people can aid in designing suitable policies for increasing its uptake by this population group. An analysis of empirical probability shows that the income level, level of education, occupation, the number of members in the household, and health condition have a determining role in the acquisition of medical coverage by elderly adults. Moreover, to these parameters, social networks and community-driven and government-enforced policies will have a substantial bearing on the development of health insurance coverage among the elderly population of Haryana.

In other words, the following demographic factors, socio-economic indicators, health status, and other relevant arguments will be considered for the review. As such, this research is imperative to policymakers and other stakeholders in the health sector, as It will shed light on the effectiveness of existing insurance schemes and identify areas where interventions can improve inclusivity, especially for the elderly. Through the analysis results, we aspire to add to the conversation on the inclusivity of health insurance to reduce the economic impact of health shock on the elderly in Haryana.

Review of Literature

The literature review provides a comprehensive overview of existing studies and insights related to the coverage of health insurance, predominantly focusing on the elderly demographic in the context of Haryana.

Sharma et al.[4], and Patel and Desai[5] analyzed the health insurance penetration within Indian states and also observed uniform distribution across different sub-divisions. The studies refer to the insurance coverage within states which is supported by insurance regulations and senior healthcare programmes. Such states as Gujarat and Madhya Pradesh had extensive insurance coverage due to strong state support and favourable regulatory frameworks.

Another two researches[6,7] have highlighted the significance of socio-economic determinants in determining the adoption of medical insurance among senior adults in India. Socioeconomic characteristics such as income levels, education, and occupation have been recognised as crucial factors that determine insurance coverage. Disparities in insurance coverage have been seen within states, based on these socio-economic indicators. In addition, Khan et al.[8], and Mishra and Singh[9] have studied how the health shocks affect the financial well-being of older individuals in various states. These studies have highlighted the importance of health insurance in ascertaining the protection from the burden of exorbitant medical costs of any kind, and among some vulnerable groups like the elderly.

Gupta[10] in 2007 stressed on the growing recognition of the vital role of health cover and other schemes in the provision of healthcare services so that individuals, as well as various institutional care providers, were exclusively dependent on insurance. Bhattacharjya and Sapra[11] have enumerated the increasing health insurance penetration in India, with the help of governments at the central and state levels sponsored and the private sector participating in health financing. Another researcher[12] advocated for government-administered insurance-based health programmes to improve access to healthcare.

According to the findings of the 75th round of NSSO[13], despite the government's efforts to promote health insurance, insurance coverage in Haryana was found to be very low. The report for the year 2017-18 revealed that most of the population in both rural and urban areas of Haryana did not have any insurance coverage. The data from the National Family Health Survey-5 (NFHS-5)[14] reveals a slight improvement in health insurance coverage levels in Haryana, particularly for women in self-help groups, and pregnant and postnatal women. This positive development is a result of targeted efforts aimed at improving health insurance coverage in the region. However, despite this improvement, there is still a significant knowledge gap regarding the factors that determine insurance coverage for the elderly population in Haryana. Several studies suggest that socio-economic status, demographic, and health-related factors may play crucial roles in determining the extent of insurance coverage for the elderly, and these factors need to be explored further to develop effective policies and programs for the elderly population.

The study is intended to complement the existing body of research and to help remedy any gaps in knowledge. It will also attempt to explore the efficiency of the existing health insurance landscape with suggestions for better coverage for the elderly population in Haryana. The foremost purpose of the project is to enhance healthcare coverage and financial protection for the elderly citizens of the state. It will focus on identifying the causes and patterns of health insurance coverage and reducing the financial burden of health crises. This study will strive to investigate the patterns of healthcare cover availability among the elderly population of the state.

The specific goals are to address the determinants of the accessibility of health insurance and their causes. The study aims to investigate how health insurance affects financial protection for the elderly and also identify the disadvantaged sub-groups of the older individuals who are more likely to be uninsured.

Methodology

The current study gathered crucial information from households with elderly residents in the state of Haryana. A multi-stage stratified systematic sampling technique with a random start was used for the data collection process. The sampling procedure involved several steps, including the selection of administrative divisions from Haryana, the selection of districts from those divisions, the selection of C.D. blocks and towns from those districts, the selection of villages and wards from those blocks and towns, and finally the selection of households that have elderly residents as targets for the study. A total of 441 elderly individuals and their household members were covered in the survey.

To gather information from the elderly individuals of the households in the sampled rural and urban PSUs, a systematic, pre-coded, and topically arranged questionnaire was created. The actual field survey began in October 2020 and continued sporadically until October 2021 depending on the field conditions from the point of view of weather, COVID-19 pandemic limits, harvesting seasons, and festival celebrations. All household and elderly data were entered in Excel format and then imported for additional analysis into SPSS and STATA. Data entry was followed by checks for missing numbers, outliers, etc., and desk editing using interpolation and extrapolation. The basic techniques used for data investigation in the study are descriptive statistics to highlight the percentage of health insurance coverage among the elderly and those who are covered and availed the health insurance when they fell sick. Also, descriptive statistics is used to ascertain the premium payer and a logistic regression model is used to govern the socio-economic and demographic factors of seeking health insurance by the entire population and the elderly.

Findings

Prevalence of Health Insurance: Health insurance is being recognised as a preferred approach for delivering healthcare to the general population in the field of policy and programmes[15-17]. Insurance coverage in India has been expanding rapidly, with not only individuals but also corporations, government bodies, and other entities progressively using insurance to fund healthcare services. Both the Central and State governments in India have been integrating insurance-based health programming into their systems. However, despite these efforts, the rate of insurance coverage in Haryana remains very low. According to the 75th round of NSSO[13], 98.0 per cent of the rural population and 82.5 per cent of the urban population did not have any form of health insurance in Haryana (public, private, or self) during 2017-18. Nevertheless, according to NFHS-5[14], the number of people with health insurance and insurance-based health schemes in Haryana saw a substantial rise during 2019-21. This growth was mainly due to the addition of healthcare plans precisely intended for women between the ages of 15 and 49 years.

Table 1

Health Insurance Coverage According to Background Characteristics, Haryana, 2020-21

Background characteristics	Percentage of elderly with health insurance	(N)	Percentage of ailing elderly who availed health insurance	(N)
Place of residence				
Rural	6.3	301	5.3	150
Urban	7.1	140	4.0	75
Gender				
Male	7.0	258	0.8	126
Female	6.0	183	10.1	99
Religion				
Hindu	6.4	389	4.1	197
Muslim	9.5	42	13.6	22
Sikh	(0.0)	(10)	(0.0)	(6)
Caste				
General	9.7	298	4.0	149
OBC	8.3	72	8.3	36
SC	5.6	71	5.0	40
Education				
No education	4.1	148	5.5	91
Up to Higher Sec.	6.4	187	1.2	81
Higher Sec. and above	10.2	106	9.4	53
Wealth quintiles				
Poorest	7.8	90	8.7	46
Poor	2.3	88	2.2	45
Medium	5.9	85	2.3	44
Rich	7.0	86	5.1	39
Richest	9.8	92	5.9	51
Land Ownership				
Owner	4.6	284	3.4	146
Landless	10.2	157	7.6	79
All	6.6	441	4.9	225
(N)	29	441	11	225

Source: Field survey, 2020-21

Note: 1. '(-)' indicates that percentages are based on 10 or less number of cases

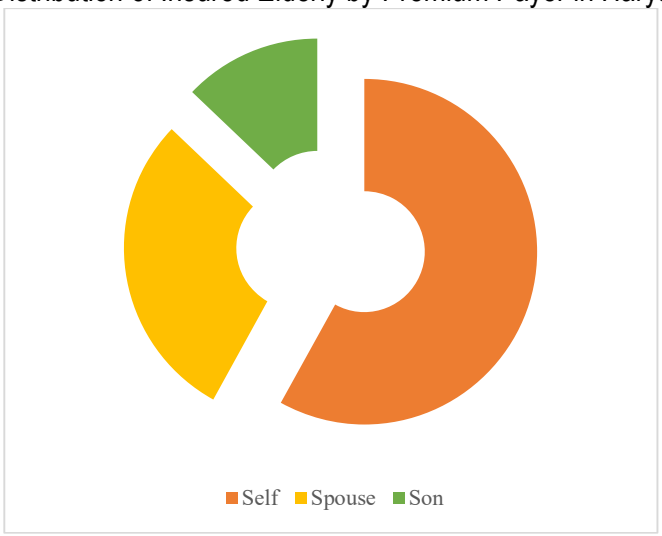
Although health insurance products are available from both commercial and public sector agencies in India, the majority of families surveyed still have limited access to health insurance. The data reveal that only 6.6 per cent of the elder population had health insurance at the time of the study. Moreover, the poverty rate for older individuals who are economically disadvantaged is as low as 2.3 per cent, while it reaches as high as 10.2 per cent for elderly individuals residing in homes without land ownership. Further investigation revealed that only 4.9 per cent of the elderly who were unwell had utilized their health insurance while receiving medical care.

Based on the data given in Table 1, it can be concluded that in Haryana, a smaller percentage of elderly individuals who are in poor health have insurance coverage compared to the percentage of elderly individuals who have insurance coverage. This suggests that some elderly individuals either choose not to use their insurance when seeking treatment or seek treatment at a facility that does not accept insurance benefits.

Payment of the Health Insurance Premium: Low insurance penetration can be attributed to individuals' limited capacity to afford insurance premiums. Most elderly people don't have a steady source of income, therefore they can't enroll in any kind of insurance in their later years, including health insurance. In light of this, the senior individuals who were currently covered in the studied households in Haryana were asked about the entity responsible for paying their health insurance premium. The responses to this inquiry indicate that just over two-thirds of the elderly (62.1 %) personally covered the cost of their health insurance premiums. In contrast, 37.9 per cent of older individuals had their health insurance premiums covered by other members of their home. Specifically, 31.1 per cent had their premiums paid by their spouse, while 13.8 per cent had their premiums paid by their sons, as shown in figure 1.

Figure 1

Percentage Distribution of Insured Elderly by Premium Payer in Haryana, 2020-21



Source: Field survey, 2020-21

Determinants of Health Insurance Subscription: An examination of the socio-economic background of the senior population in Haryana helps determine the causes behind poor health insurance penetration. Logistic regression investigation reveals that the ownership of agricultural land has a substantial impact on health insurance coverage. Specifically, an increase in the size of the landholding decreases the likelihood of purchasing a health insurance plan, with statistical significance at a p-value of less than 0.05 per cent. In contrast, the factors that impact healthcare insurance for non-elderly individuals are quite varied and include place of residence (statistically significant at $p<0.10$), households with scheduled caste status (statistically significant at $p<0.10$), age (measured in completed years, statistically significant at $p<0.01$), education (measured in completed years, statistically significant at $p<0.05$), and agricultural land ownership (measured in acres, statistically significant at $p<0.01$) as shown in Table 2.

The land's negative impact on the adoption of health insurance can be qualified to the fact that elderly individuals in land-owning households, who are typically more financially secure, do not perceive it as necessary to buy insurance since they have the means to cover unforeseen healthcare expenses. In contrast, landless households avail themselves of the AB-PMJAY programme, a government-sponsored health insurance programme, to finance the healthcare requirements of their older members.

Table 2

Socio-economic and Demographic Determinants of Seeking Health Insurance by Entire Population and Elderly in Haryana, 2020-21

Background characteristics	Non-elderly			Elderly		
	β (S.E.)	Odds ratio	Confidence interval	β (S.E.)	Odds ratio	Confidence interval
Place of Residence						
Rural®	--	--	--	--	--	--
Urban	0.591* (.0352)	1.806	0.905-3.603	0.507 (1.661)	1.661	0.655-4.209
Sex						
Male®	--	--	--	--	--	--
Female	0.268 (0.327)	1.308	0.689-2.483	-0.113 (0.441)	0.893	0.377-2.118
Religion						
Hindu®	--	--	--	--	--	--
Muslim	1.221 (0.598)	2.680	0.848-4.651	1.058 (0.600)	1.300	0.689-2.483
Sikh	1.699 (0.598)	1.510	0.000-2.069	1.563 (0.600)	1.200	0.829-2.490
Caste						
General®	--	--	--	--	--	--
OBC	0.375 (0.498)	1.456	0.549-3.861	-0.088 (0.640)	0.916	0.261-3.208
SC	1.016* (0.580)	2.762	0.887-8.602	0.248 (0.847)	1.281	0.243-6.742
Wealth index	0.216 (0.194)	1.241	0.849-1.816	0.342 (0.270)	1.408	0.829-2.390
Current age (in completed years)	0.32*** (0.009)	1.032	1.015-1.051	-0.001 (0.031)	0.999	0.940-1.062
Education (in completed years)	0.103** (0.037)	1.108	1.031-1.191	0.076 (0.051)	1.079	0.976-1.192
Agricultural land (in acres)	-0.237*** (0.065)	0.789	0.694-0.897	-0.132** (0.067)	0.876	0.769-0.998
MPCE (in Rs.)	-0.464 (0.608)	0.629	0.191-2.069	-0.014 (0.823)	0.986	0.197-4.947
Constant	-21.623 (1.058)	0.000	--	-21.183 (1.600)	0.000	--

Source: Authors own calculations

Note: 1. ***: Significant at 1 percent level, **: Significant at 5 percent level, *: Significant at 10 percent level

2. Figures in (-) indicate the Standard Error

3. ®: Reference category

4. For all: R^2 = 0.716 (Hosmer and Lemeshow), 0.037 (Cox and Snell), 0.131 (Nagelkerke), For elderly: R^2 = 0.932 (Hosmer and Lemeshow), 0.033 (Cox and Snell), 0.085 (Nagelkerke)

5. For all: Chi^2 (8) =5.380, For elderly: Chi^2 (8) =3.040

Discussion and Conclusion

The study provides critical insights into health insurance access and utilization among the elderly in Haryana and highlights the complex factors that influence them. Our analysis shows that although there is a growing awareness of the need for health insurance, significant obstacles remain that hinder the enrolment and effective utilisation of these services by the elderly.

The research uncovers differences in how older people, in Haryana, can get health insurance. Factors like their status, personal details and owning property affect whether they can get health insurance. The outcomes show that many elderly individuals in Haryana who have insurance pay for their premiums on their own showing independence. Besides offering help, children pay premiums for their parents brings focus to the role of other household members' support in ensuring that older adults have access to healthcare. The current study emphasises the need for policy measures to enable people to overcome any barriers that prevent them from enrolling in health insurance, in Haryana. Improving the enrolment of health insurance would require easing enrolment processes, increasing awareness of the benefits of insurance and developing insurance products that are tuned to the characteristics of the elderly population.

While the existing research provides a glimpse into the trends of health insurance use among the elderly, in Haryana further studies will have to be conducted to help determine how health insurance affects health outcomes and general well-being. A clear understanding of which health insurance schemes augment outcomes and reduce financial stress will go a long way in helping shape future health policies: this is highlighted in the report. The elderly in Haryana deserve improved health insurance coverage which can protect against health shocks at an economic level. They need more support, to overcome the barriers identified, such as lack of stability and availability of healthcare.

Overall, hence, the research suggests improvement in the availability of Mediclaim to old people in Haryana with the help of policies and an awareness program should be made. Governments can try their best to make sure that their older population can have a good financial position to get health insurance and use it, policymakers can strive to translate the many determinants that influence whether an older person can maintain the resource of health insurance into the usage of it.

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GUIDELINES FOR AUTHORS

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How to submit the manuscript: It is mandatory for the author/s to submit the soft-copy of the manuscript through an e-attachment to The Editor- National Institute of Health and Family Welfare, Munirka, New Delhi-110067 at- **editor@nihfw.org.** As a part of 'green initiative,' we don't accept hard copies from the authors. The manuscript must be type-written in **MS Word only**, **Arial Narrow**, Font size- 13, Colour- black, single column and single spacing with wide margins in A-4 size. The paper must accompany a declaration that it is an original creation of the author/s; and has not been published / submitted for publication anywhere else. In the absence of such a declaration by the author/s, it would be assumed that the paper is an original creation of the concerned author/s; and has not been published / submitted for publication anywhere else. **The concerned author/s will be solely responsible for any kind of plagiarism or copy right violation in the published papers**. Any communication from the Editor, to the author/s; will be done only through e-mail. The paper should be precisely written following **APA style/format**. The flow of the paper to be followed is: Title – Abstract – Key words – Introduction – Methodology – Findings – Discussion – Conclusion and Recommendations – Conflict of Interest – Acknowledgement - References. The title of the paper should be short and clear. The author should keep a copy of the manuscript. The institute reserves the right to make necessary editorial changes. The paper must not exceed 5000 words, with an abstract of not exceeding 200 words preceded by the title and followed by a maximum of 7 key-words. The combined number of Tables, Graphs, Figures, Illustrations and Charts must not go beyond 10. Tables with borders, Graphs, Figures, Illustrations, Legends and Charts must not appear at the end of the paper but these should be given at appropriate places amidst the text content in only black colour. The Tables, Figures and Illustrations must be within the printing area of the book in A-4 size with wide margins.

Labelling of the figures shall be re-entered by the Editor to conform to a uniform style, wherever necessary. Each table should be referred to as e.g. Table 4 using Arabic number. Tables with borders must be appropriately cited in the text. Legends should be typed on the same sheet of table.

References: All the references should be cited in superscript in a numerical consecutive order in the text. The reference list should also be arranged in the same order at the end of the paper. References not reflected in the text, must not be included in the list of references and vice-versa. Care should be taken to quote the page number where the article begins in a periodical, or the source from where the statement has been quoted.

Papers submitted without adhering to the HPPI format, will not be considered for publication. Decision of the Editorial Board with regard to the suitability of the papers for publication is final. Authors are requested not to enquire about the status of their papers within four months from the date of submission. Due to heavy flow of papers, authors are informed not to send more than one paper in a calendar year; if submitted, those will neither be acknowledged nor be reviewed.

(Dr. Bishnu Charan Patro)
Associate Editor, HPPI

THE NATIONAL INSTITUTE OF HEALTH AND FAMILY WELFARE

The National Institute of Health and Family Welfare (NIHFW) an autonomous organization, under the Ministry of health and Family Welfare, Government of India, acts as an 'apex technical institute' as well as 'think tank' for the promotion of Health and Family Welfare programmes in the country. The NIHFW is known for its Education, Training, Research, and Specialized advisory services.

Educational activities: The educational activities of the Institute contribute to Human resource development for better management of health and family welfare programmes in the country. The on campus courses are: Three-year Post-graduate Degree in Community Health Administration, a two-year Post-Graduate Diploma in health Administration, and a one year Post-Graduate Diploma in learning mode of one year duration each. These are: Health and Family Welfare management, Hospital management, health Promotion, health Communication, Public Health Nutrition and Applied Epidemiology. These courses are need based and multidisciplinary in nature. The Institute has also developed certificate courses through e-learning mode for enhancing the skills and competencies of in-service middle level health professionals in the areas of 'Professional Development in Public health and Health Sector Reforms' for Medical Officers, and "Programme Management for Public Health care for the Programme Managers working in national health Mission or in the health sector.

Training and Workshops: The training courses and workshops (intramural and extramural), numbering around 45-50 are organized by the Institute every year with an aim to familiarize the participants with the goals and the objectives of health and family welfare programmes; updating their knowledge and understanding of operational difficulties in implementation and suggesting remedial measures to overcome such constraints.

Research and Evaluation: The Institute gives priority attention to research in various aspects of health and family welfare. The Institute has an Academic Committee and a high level Programme Advisory Committee for ensuring the quality in academic endeavours. The Institute also conducts evaluation studies of National Health Programmes and various other related activities initiated by the Government of India.

Specialized Services: Specialized services of the Institute include Clinical services, National Cold Chain and Vaccine Resource management Centre (NCCVMRC), Centre for Health Informatics, Skill Lab, National Documentation Centre and publications. The ministry of health and Family Welfare (MoHFW) has entrusted the Institute to act as a "National Nodal Agency" to organize, coordinate and monitor the training programmes of Reproductive and Child health (RCH) in the country. The main objective of the Clinic is to render Mother and Child Health services. The clinical work in relation to infertility, reproductive disorders, especially endocrinology and sexual dysfunctions deserve special mention. NIHFW in partnership with UNICEF through the National Cold Chain Management Information System, is responsible for the overall maintenance, implantation and monitoring of NCCMIS across the country including providing support to the end users. The reference, referral, press clipping and bibliographic services of the National Documentation Centre; and the publication, art and projection services of the Department of Communication compliment the activities of the Institute.

Advisory and Consultancy Services: The Director and faculty members of the Institute provide advisory and consultancy services to various national, international and voluntary organizations in various capacities.

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