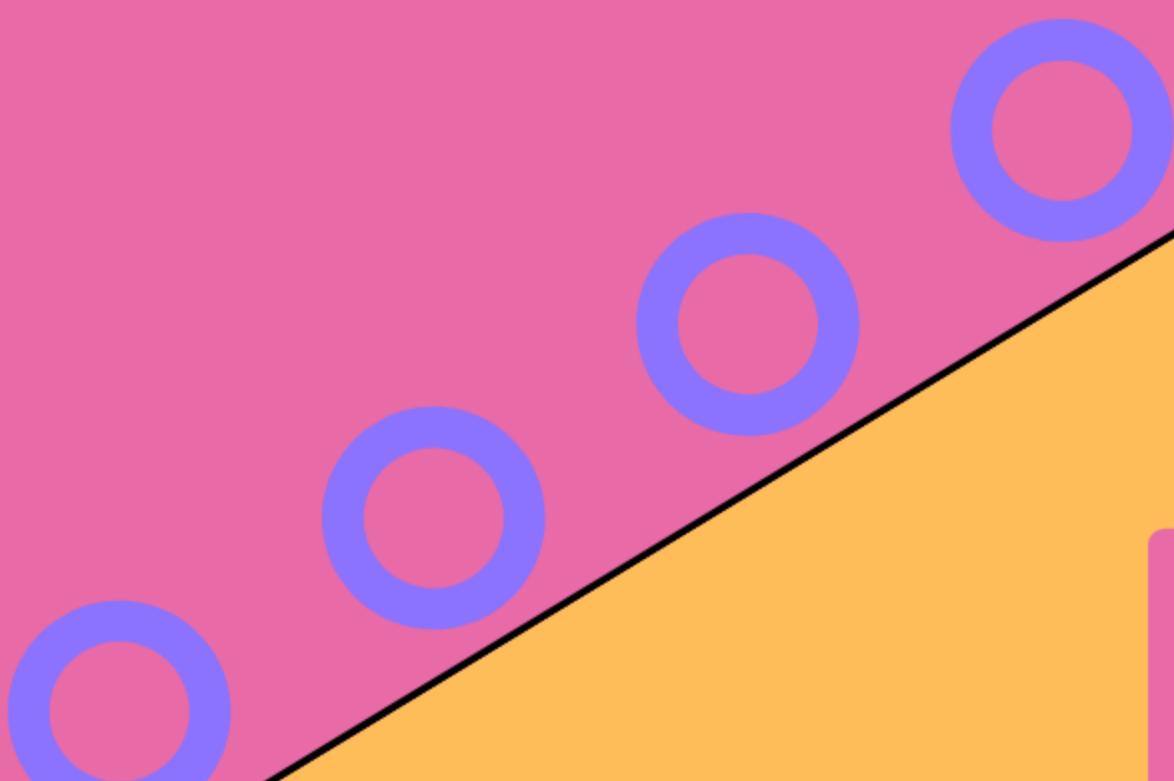


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FDI and Covid-19

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Abstract

Magnitude of economic disruption caused by COVID-19 pandemic is expected to cause drop of FDI inflows. Financial organisations such as UNCTAD and OECD predicted severe drop of FDI, for developing nations in particular. India also witnessed FDI drop of ~45% in the first-quarter (Q1) of financial year (FY) 2020-21 relative to Q1 FY 2019-20, which ignited predictions that FDI inflows during pandemic times could be low. Since FDI inflows are linked to India's economic growth, this article explores the impact of COVID-19 pandemic on India's FDI inflows during FYs 2020-2021 and 2021-22 by time-series analysis of the quarterly data of FY 2010-11 to FY 2019-20. Our model predictions agree within ~4% of the reported FDI for the FY 2020-21. Furthermore, our model predicts an estimated increase of ~14% (optimistic scenario), ~6% (middle-path) and ~1% (pessimistic scenario) during the 2nd pandemic year (FY 2021-22) relative to the first pandemic year (FY 2020-21); while the predicted increases respectively are ~23%, ~15% and ~9% relative to pre-pandemic level (FY 2019-20). Our predictive analyses therefore suggest that COVID-19 may not impact India's FDI inflows during the pandemic years.

Keywords: Foreign Direct Investment (FDI); Time-series analysis; ARIMA; Indian Economy; COVID-19; Forecasting.

Introduction

COVID-19 pandemic possibly emerged as the biggest health crisis thus far reported. India registered its first COVID-19 case at the end of January 2020, and in providing a fast, strong and effective response to minimize the virus-spread and human loss, on 25th March 2020. Government of India imposed a nationwide lockdown which was expected to slow down Indian economy. Global financial crises (e.g., the great recession of 2008) are known to have adverse impact on most of the world economies; however, a health crisis becoming the deterministic cause of economic slowdown (fall of GDP) of such great magnitude was perhaps not envisaged.

Developing countries such as India's economic growth is linked to FDI (Nunnenkamp and Chakraborty, 2008; Ahmed, 2013). Since India's economic liberalisation in 1990-91 it had received \$ 697 billion until pre-pandemic financial year (FY) 2019-20. Empirical relationship between *logarithm-FDI* versus *time* suggested that India's FDI grew at ~20% per year during the last three decades. After the outbreak of the Virus, United Nations Conference on Trade and Development (UNCTAD) in one of its first reports (UNCTAD, 2020) predicted a fall of ~30-35% in global FDI. Similar concerns were echoed by Organisation for Economic Co-operation and Development (OECD) who predicted even more drop in inward inflows of developing countries (OECD, 2020). For India, FDI in Q1 (FY 2020-21) fell by ~45% relative to the corresponding Q1 of FY 2019-20, and thus ignited the initial speculation that inflows during the pandemic year could be abysmally low. However, the provisional FDI data of Q2 and Q3 showed a phase of recovery while Q4 data again exhibited a decrease, and thus the uncertain nature of FDI during pandemic times. Since FDI could play a major role in supporting economies during and after the pandemic years through financial support of their affiliates and through linkages with local firms (Desai et al., 2008; Alvaro and Chen, 2012), it is important to assess the FDI inflows during the pandemic times.

This study stems from the primarily objective whether pandemic has had impacted India's FDI inflow during FY 2020-21, and will it impact FY 2021-22. We performed a time-series analysis of quarterly FDI data of the pre-pandemic years (FY 2010-11 to FY 2019-2020; 40 data points) and forecasted the annual FDI inflows of FYs 2020-21 and 2021-22. Additionally, another time-series analysis was performed taking the available quarterly data of 1st pandemic year into the training dataset so to include the investment-uncertainties in one pandemic year (FY 2020-21) to forecast the FDI in the next pandemic year (FY 2021-22).

2. Data source and methodology

Two data resources are used in the study. First is openly accessible website of the directorate of industrial promotion policy (DIPP; <https://dipp.gov.in/>), Ministry of Finance, Government of India. The second one is the Centre of Monitoring of Indian Economy (CMIE) through digital access of their database (<https://www.cmie.com/>) in July 2018. Due to non-accessibility of CMIE data thereafter, annual FDI inflows for the FYs 2018-19 and 2019-20, and for Q1, Q2, Q3 and Q4 data were taken from the DIPP website, which are declared as provisional.

We used Auto Regressive Integrated Moving Average (ARIMA) method for time-series modeling and building the forecasting model—the mathematical-and-computational basis of which are discussed by Shah and Jhaveri (in press). MATLAB® is used for model development, training, testing and forecasting—the results obtained are reported through statistical tests, parameters and graphical illustrations. While using MATLAB®, the data are stored in a single Microsoft excel file along with time label (i.e., quarter no and last two digit of the financial year). These time-series data are imported into MATLAB® using import data utility, and stored as a table in MATLAB® workspace. The table is then stored as a .mat file in a working directory.

We performed the time-series analyses in three ways (Case-I, -II and -III) with a slightly varying number of quarterly data into the training dataset (Table 1A). For example, Case-I (Case-II) has training dataset which is subset of training dataset in Case-II (Case-III). In the discussion section we present Case-I in details while results from Cases-II and III are summarized in brief (Table 1B).

3. Results and discussion

India's FDI inflows during Q1, Q2, Q3 and Q4 of FY 2020-21 were \$11.5, 28.1, 26.1 and 13.4 billion respectively with a 4Q-cumulative of \$79.2 billion, average of 19.8 billion per quarter, and a high standard deviation of 8.5 billion per quarter indicating large variability in the quarterly investments during the pandemic year. Incidentally, the reported gross FDI during the first-pandemic-financial-year (FY 2020-21) is ~10% lesser than what we forecasted (~\$87.5 billion) by time-series analysis of annual FDI data from FY 1991-92 to FY 2019-20, indicating that impact of COVID-19 on India's FDI inflows during FY 2020-21 may be nominal (under preparation).

3.1. Time-series analysis and forecasting: Here we present in details Case-I, wherein the 44-quarter dataset is divided into training dataset containing first 37 quarters (FY 2010-11 Q1 to 2019-20 Q1 and 84% of total data) and testing dataset containing last 7 quarters (FY 2019-20 Q2 to 2020-21 Q4 and 16% of total data). This follows the 80-20 rule approximately for apportioning total data among training and testing data. The objective to run the time-series of the pre-pandemic quarterly data was to recognize the trend in FDI, forecast the FDI in the pandemic FY 2020-21, and finally attribute any observable difference in FDI during FY 2020-21 to COVID-19. The mathematical equations used and the computational details (MATLAB) involved in the time-series model are explained in Shah and Jhaveri (2021).

Time-series for training data is plotted in Figure 1 (a). Visual inspection suggests that the time-series data is not stationary (fluctuating variance) with no proper seasonality (Fig. 1a). Such time-series data are very difficult to model and hence it is required to perform objective tests for stationarity. We have

used the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit-root test and trend stationarity test following Frain (2010). The logarithm of time-series is taken to stabilize the variance to some extent (Fig. 1b). Also, the difference of resulting time-series is taken (one sample less than original series) and stationarity test is conducted again on resulted time-series (Fig. 1c). The differenced time-series data pass the stationarity test and suggest the need of ARIMA model with parameter $d = 1$ to circumvent the non-stationarity in original time-series.

The next step is to obtain Auto Correlation Function (ACF) and Partial Auto-Correlation Function (PACF) of logarithm of original time-series, and to decide the parameters p and q of the ARIMA time-series model. The results in Fig. 2 suggest ACF decay slowly and the minimum value of q must be taken as 4, while inspection of PACF suggest that a value of $p = 3$ is sufficient. Therefore, the time-series model for the given training data is ARIMA (3, 1, 4). Now, the coefficients and other model parameters can be estimated by fitting the model to the time-series data. The Akaike Information Criteria (AIC) value of the fitted model is computed to be very small (-58.0010), which indicates good model fitting to the given training data.

Check on the goodness-of-fit is carried out for our final fitted model. This can help in identifying areas of model inadequacy and also suggest ways to improve the model. Residual diagnostic (Fig. 3) plot is used to assess violation of model assumptions. Residuals are checked for normality and residual autocorrelation. If residual ACF and PACF give a significant result, there is a need to improve the model fit by adding AR or MA terms (<https://in.mathworks.com/help/econ/>) which is not required in our case. The quantile-quantile plot (QQ-plot) and kernel density estimate show no obvious violations of the normality assumption (Fig. 3). ACF and PACF plots of residuals in Fig. 4 confirm that the residuals are uncorrelated.

The predictive performance checks require dividing total available data into two parts: a training set and a validation set. The model is fitted only on the training data, and then the fitted model is used to forecast over the validation period using testing data. We assessed the predictive performance of the model by comparing model forecasts against the true observations using prediction mean square error (PMSE) as the numerical summary of it. Fig. 5 illustrates forecasting capability of the fitted model within 95% confidence interval. The forecasting is done for total of eleven quarters; out of which seven quarters (FY 2019-20 Q2 to FY 2020-21 Q4) is testing with available data and next four quarters (FY2021-22 Q1 to FY 2021-22 Q4) are future predicted values. We found low value of the PMSE (0.0196) indicating small prediction error for testing data and hence the predicted values are reliable with 95% confidence.

Results obtained from the ARIMA time-series analyses (Case-I, Case-II and Case-III) are summarized in Table 1B. We forecasted annual FDI values of \$ 78.4 billion (Case-I) and \$ 76.1 billion (Case-II) for the FY2020-21, which agrees within $\sim 1\%$ and $\sim 4\%$ respectively of the provisionally reported value of \$ 79.2 billion, indicating robustness of our predictions. Our model-predictions for the 2nd pandemic year (i.e., FY 2021-22) for the three different time-series runs are \$ 80.2 billion (Case-II), \$ 84.3 billion (Case-I) and \$ 90.1 billion (Case-III). These suggest that even under a pessimistic scenario (Case-II) FDI during the FY2021-22 may not observe a dip and may remain somewhat static relative to FY2020-21. Under the optimistic scenario (Case-III) and under the middle-path (Case-I) we predict an increase of $\sim 14\%$ and $\sim 6\%$ respectively during FY 2021-22 relative to FY 2020-21. Similarly, relative to the pre-pandemic levels (FY 2019-20) the predicted increase in FDI during FY 2021-22 varies from $\sim 9\%$ to $\sim 23\%$ so to suggest COVID-19 pandemic will have nominal impact on India's FDI inflows. It is to be noted that FDI data of Q4 FY 2021-22 is awaited while the gross provisional FDI its first 3 quarters (Q1, Q2 and Q3) is \$ 60.3 billion (<https://dipp.gov.in>; accessed May 2022).

4. Conclusions

Impact of COVID-19 pandemic on the India's FDI inflows has been assessed through ARIMA time-series modelling. Model predictions show very good agreement (with 95% confidence level) with the reported FDI of FY 2020-21. Furthermore, annual predictions for the 2nd pandemic year (FY 2021-22) show estimated increase between 1% to 14% and 9% to 23% relative to FY 2020-21 and FY 2019-20 respectively. Our model predictions thus suggest that COVID-19 may not have significant negative impact on India's FDI inflows during pandemic times.

Acknowledgments

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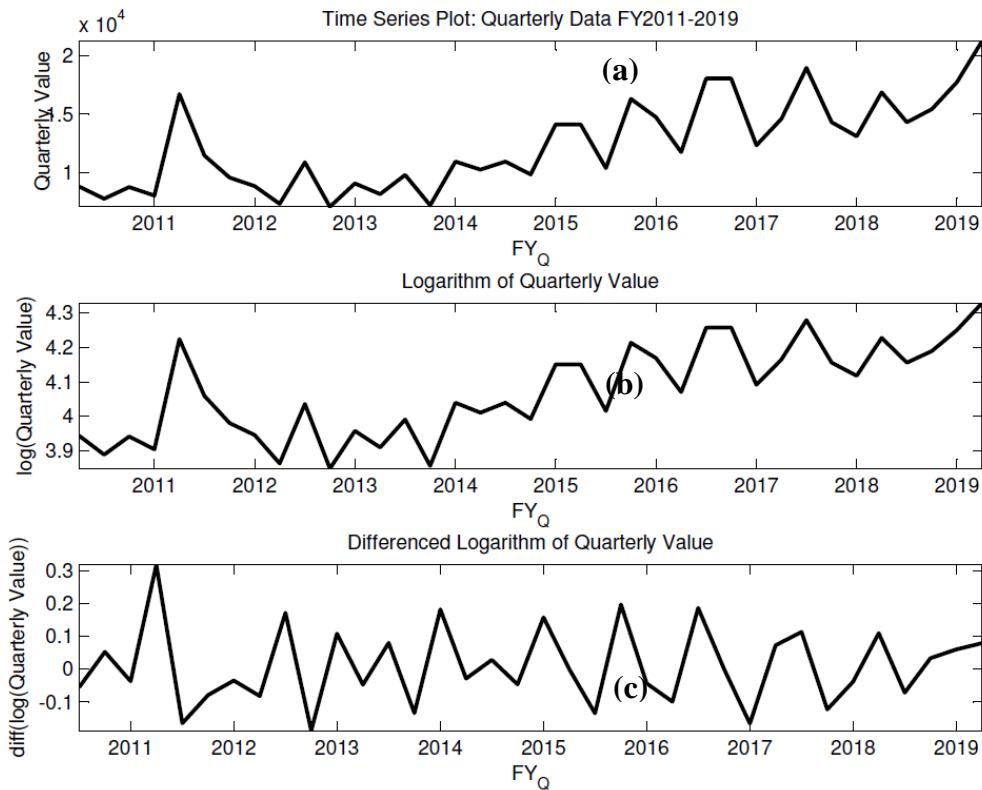


Figure 1: Plot of FDI data from FY 2010-11 Q1 to FY 2019-20 Q1 in different forms.

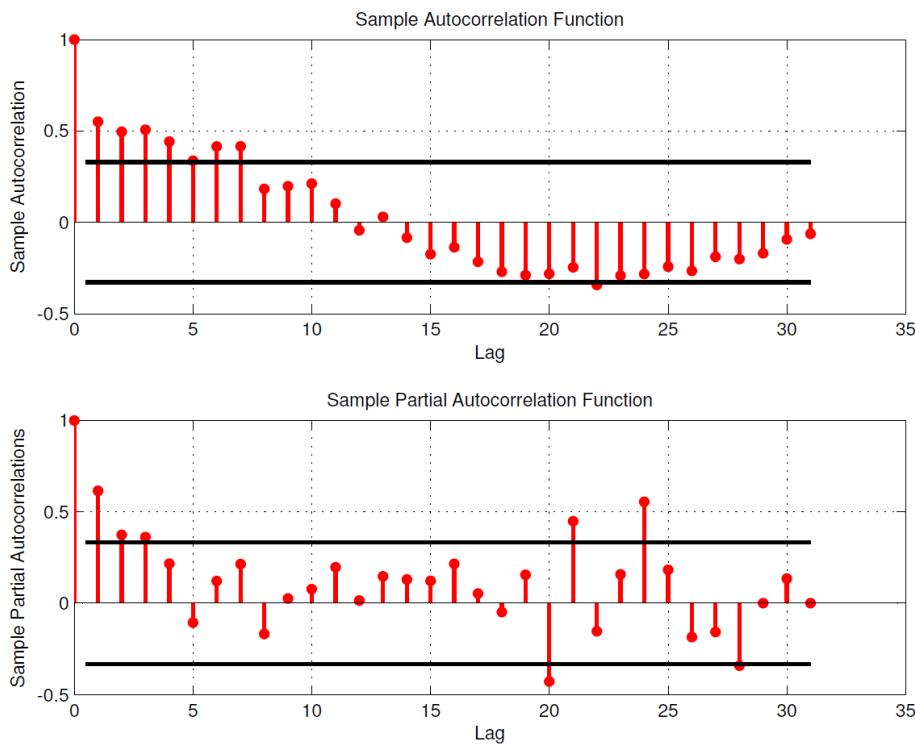


Figure 2: Plot of ACF and PACF of training data time-series

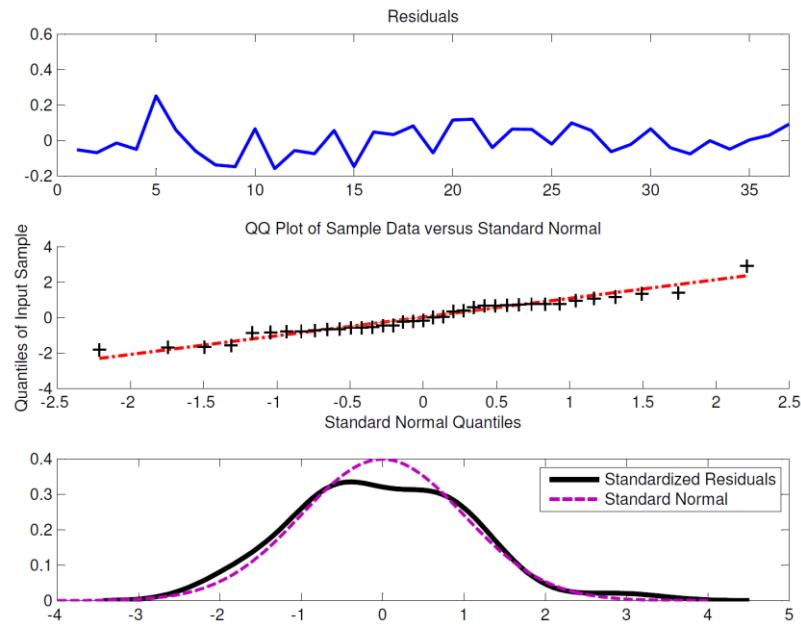


Figure 3: Plot of residual, quantiles and distribution function

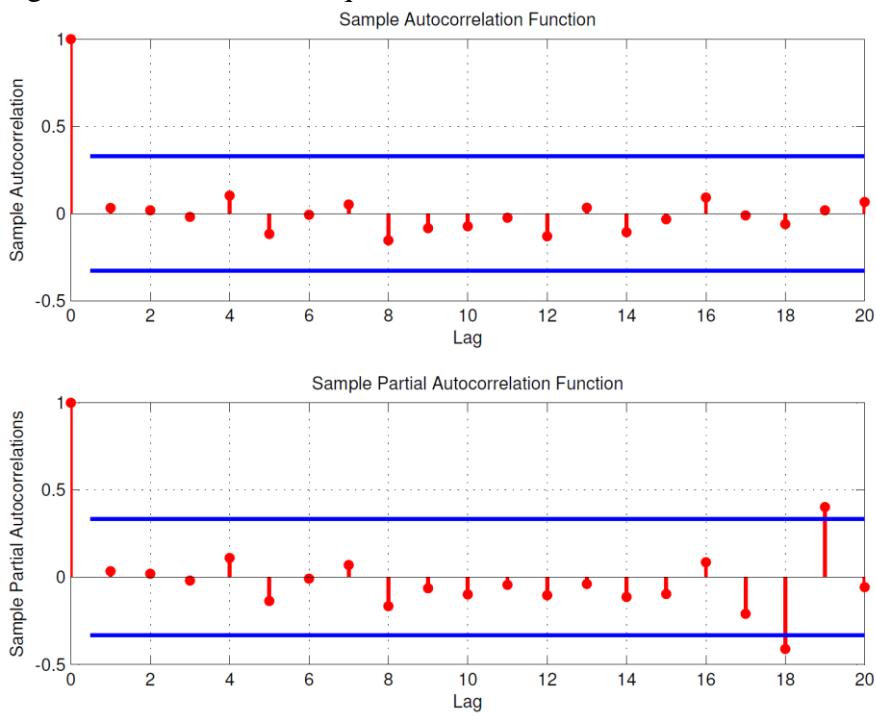


Figure 4: Plot of ACF and PACF for residuals

Case	Training dataset (Quarters)	Testing Dataset (Quarters)	Prediction dataset (Quarters)
	37 FY 2010-11 Q1 to 2019-20 Q1)	7 FY 2019-20 Q2 to 2020-21 Q4)	4 FY2021-22)
I	40 FY 2010-11 Q1 to 2019-20 Q4)	4 FY2021-22)	4 FY2021-22)
II	44 FY 2010-11 Q1 to 2020-21 Q4)	0	4 FY2021-22)

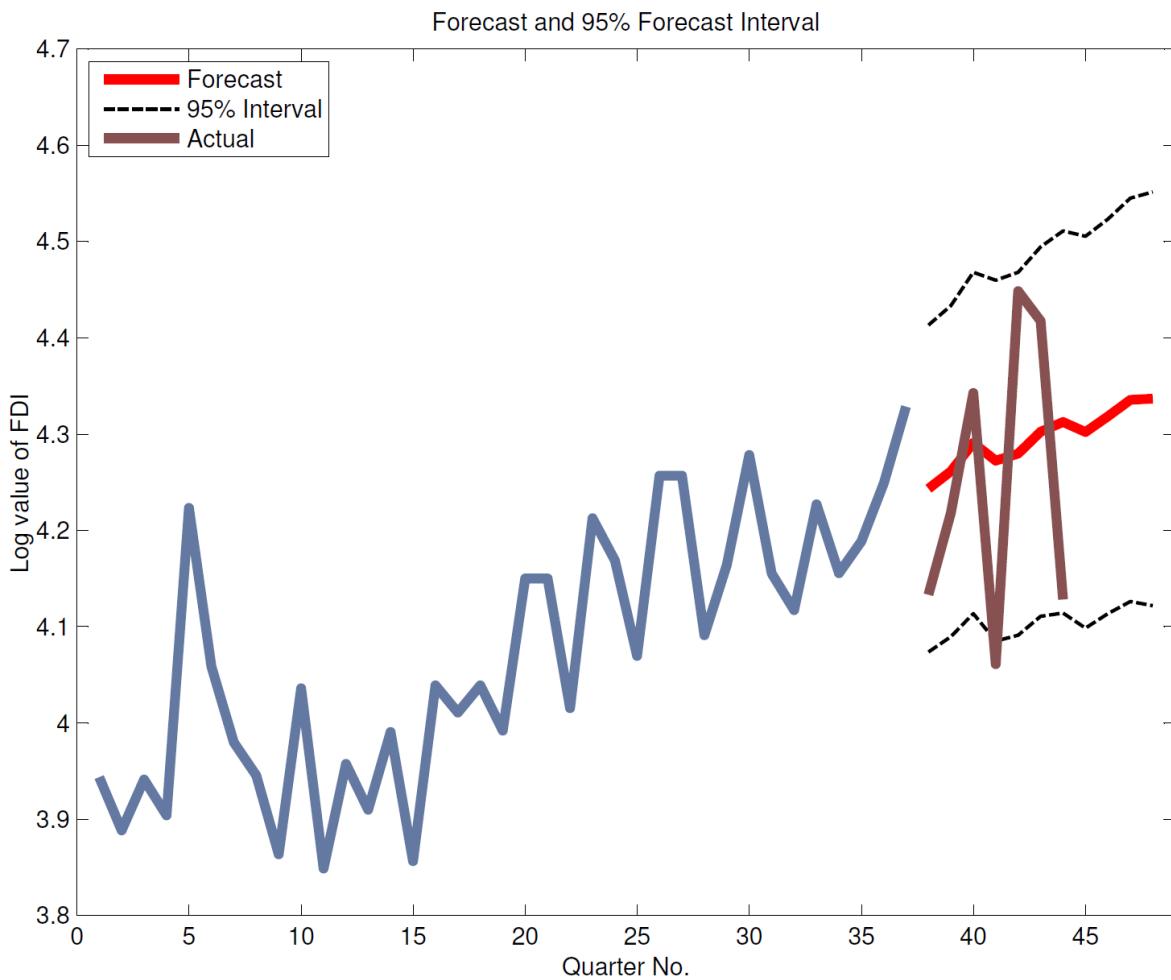


Figure 5: Plot of forecasting for 11 quarters (7 testing quarters and 4 upcoming quarters)

Table-1A. Time-series analysis with varying set of training, testing and prediction dataset (in quarters)

Case	Predicted annual FDI (\$ billion) (FY 2020-21)	Predicted annual FDI (\$ billion) (FY 2021-22)
	78.4	84.3
I	76.1	80.3
II	Not applicable	90.1

Table- 1B. Forecasted annual FDI values for the two pandemic financial years (actual value during FY2020-21 is \$ 79.2 billion).

SLEEP QUALITY PATTERNS AND THE QUALITY OF SLEEP

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ABSTRACT

This study investigates sleep quality among young adults, focusing on gender differences and the influence of occupational roles. A sample of 110 participants, evenly split between males and females, including part-time workers and students, underwent assessments using the Pittsburgh Sleep Quality Index (PSQI). Descriptive statistics and independent samples tests were conducted to analyze the data. Results revealed no significant gender differences or differences between part-time workers and students in sleep quality. The findings suggest a need for tailored interventions to address sleep-related challenges in these demographic groups.

Keywords: Sleep quality, young adults, gender differences, occupational roles, part-time workers, students, Pittsburgh Sleep Quality Index (PSQI), intervention strategies.

INTRODUCTION

Sleep quality is a critical component of overall health and well-being, particularly among young adults who are in a dynamic phase of life characterized by academic pursuits, career development, and social engagements. Adequate and restorative sleep is essential for cognitive functioning, emotional regulation, physical health, and overall quality of life.

However, this age group often faces challenges that can impact their sleep patterns and behaviors. Young adults often experience a myriad of challenges that can affect their sleep. The transition from adolescence to adulthood brings new responsibilities and stressors, including academic pressures, job responsibilities, financial concerns, and social obligations. These factors can lead to irregular sleep schedules, difficulty in falling or staying asleep, and disruptions in sleep continuity, ultimately contributing to poor sleep quality.

Moreover, societal shifts, such as the prevalence of digital devices and the 24/7 availability of information and entertainment, can interfere with sleep hygiene. Excessive screen time, especially close to bedtime, can disrupt circadian rhythms and hinder the ability to achieve restorative sleep. Additionally, the influence of social interactions, relationships, and environmental factors like noise and light pollution further impact sleep patterns among young adults. Research indicates that sleep disturbances and insufficient sleep are common among young adults, with implications for their mental and physical health. Poor sleep quality has been linked to increased stress levels, reduced academic and work performance, mood disturbances, and heightened risk for various health conditions. Understanding the factors influencing sleep quality in this demographic is crucial for developing targeted interventions and support strategies to improve sleep health.

NEED OF THE STUDY

This study is motivated by the pressing need to delve into the intricacies of sleep quality among young adults, a demographic prone to various challenges in maintaining optimal sleep patterns. The paramount importance of adequate sleep for overall health and cognitive function underscores the urgency of understanding the factors influencing sleep quality.

Gender differences in sleep behaviors and the potential impact of occupational roles on sleep patterns add layers of complexity to this inquiry. Previous research has hinted at potential disparities in sleep quality based on gender, highlighting the necessity of a more comprehensive investigation. Moreover, the distinct experiences of part-time workers and students in managing their time and responsibilities may manifest in divergent sleep outcomes. This study seeks to bridge these gaps in

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knowledge by conducting a rigorous examination of sleep quality across these demographic variables.

The relevance of this research extends beyond theoretical insights, as it holds practical implications for health promotion and intervention strategies. By identifying patterns and potential disparities in sleep quality, tailored interventions can be designed to address specific needs within these subgroups. Such evidence-based approaches are crucial for developing effective support systems and policies aimed at enhancing sleep hygiene and overall well-being among young adults, contributing to their long-term health outcomes and quality of life.

AIM OF THE STUDY

This study explores the gender differences in sleep quality among young adults and to investigate the difference in sleep quality between individuals who are part-time workers and those who are students.

RESEARCH METHODOLOGY

Objective:

To examine the gender difference in sleep quality.

To examine the difference in sleep quality between individuals who are part time workers and those who are students.

Hypothesis:

There is a significant mean difference in sleep quality among gender.

There is a significant difference in sleep quality between individuals who are part time workers and those who are students.

Research Type: It is a quantitative study. **Sample Technique:** The random sampling techniques is used to collect data in this study. **Sample Size:** This study includes 110 samples with equal ratio of males and females.

Rationale:

This research examines differences in sleep quality between students and part-time workers, as well as gender disparities in sleep quality among young adults. Because it affects mental clarity, emotional steadiness, and physical health, the quality of one's sleep is an important component of health and wellness in general. By delving into these patterns, we may find ways to improve sleep health for certain demographics via focused treatments and support techniques.

This research aims to compare the sleep quality of students and part-time workers to those of full-time employees in order to determine if there is a gender difference in this area and whether there is an effect of occupational status on this variable. Taking into account variables including hormonal effects, social roles, work responsibilities, and stress levels, the assumptions suggest that there are substantial gender and occupational status-based disparities in the average quality of sleep.

A total of 110 individuals, evenly split between men and females, will have their data gathered using a quantitative method and random sampling procedures. To measure sleep quality, we will use standardised instruments; to evaluate for differences, we will use statistical methods such independent t-tests and regression analyses. By considering gender and occupational settings, this study hopes to provide insights that help improve sleep hygiene and general well-being in young people via targeted treatments, policies, and educational programmes.

Description of Tools Used: PSQI (Pittsburgh Sleep Quality Index) created by Dr. Buysse questionnaire was used in the study. The PSQI has exhibited commendable levels of test- retest reliability and internal consistency. The PSQI has been validated. It has demonstrated strong concurrent validity with these objective measures, suggesting that it captures various facets of sleep quality accurately.

Procedure: The present generational gap and research gap between various groups were investigated by reviewing over a hundred research publications. There was an examination of validity, reliability, and standardised instruments. Offline forms were used to gather data after creating questionnaires. Permission was obtained from the participants. After the raw data was transformed into a Sten score in Excel, the data set was analysed using SPSS.

Statistical Analysis: An Independent T-test is performed to understand the gender difference between the variables.

RESULT

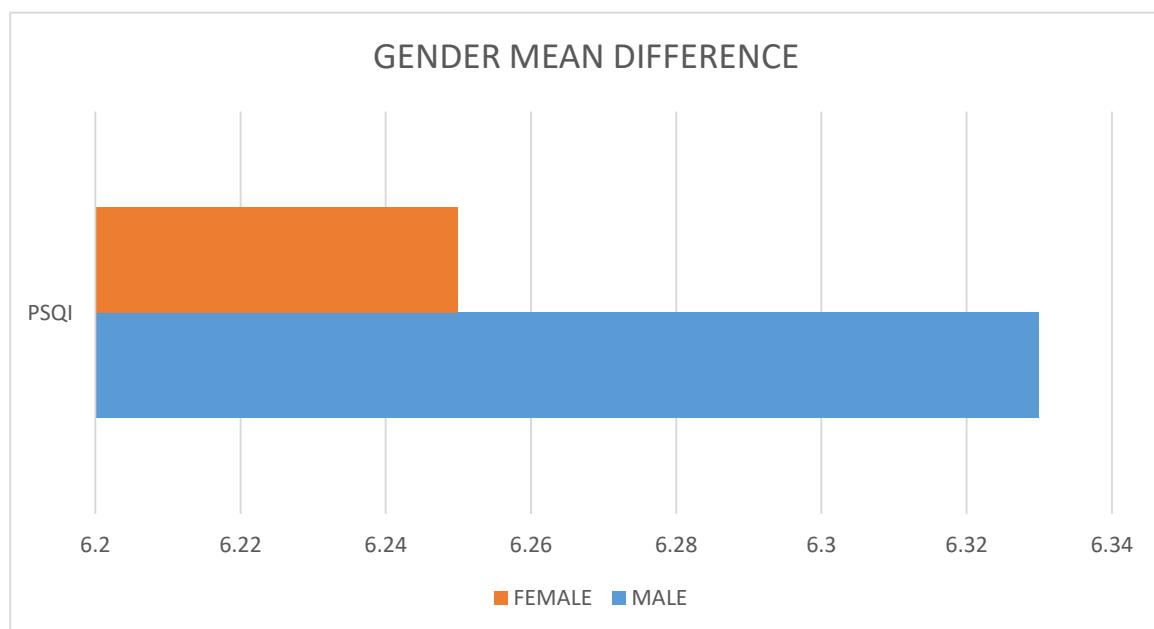


Figure 1 Gender Mean Difference

Table-1. Independent Samples Test

		Levene's Test for Equality of Variances	t-test for Equality of Means							95% Confidence Interval of the Difference	
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PSQI SCORE	Equal variances assumed	.006	.938	-.144		108	.886	-.073	.507	-1.077	.932

Equal variances not assumed										

Table 1 presents the results of the Independent Samples t-test conducted to assess the equality of means for PSQI (Pittsburgh Sleep Quality Index) scores between two groups, categorized by gender.

Table 2. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
PSQI SCORE	Equal variances assumed	.332	.566	.287	108	.775	.145	.507	-.859	1.150
	Equal variances not assumed			.287	107.930	.775	.145	.507	-.859	1.150

Table 2 displays the results of the Independent Samples Test for PSQI (Pittsburgh Sleep Quality Index) scores, comparing part-time workers (group 3) and students (group 4).

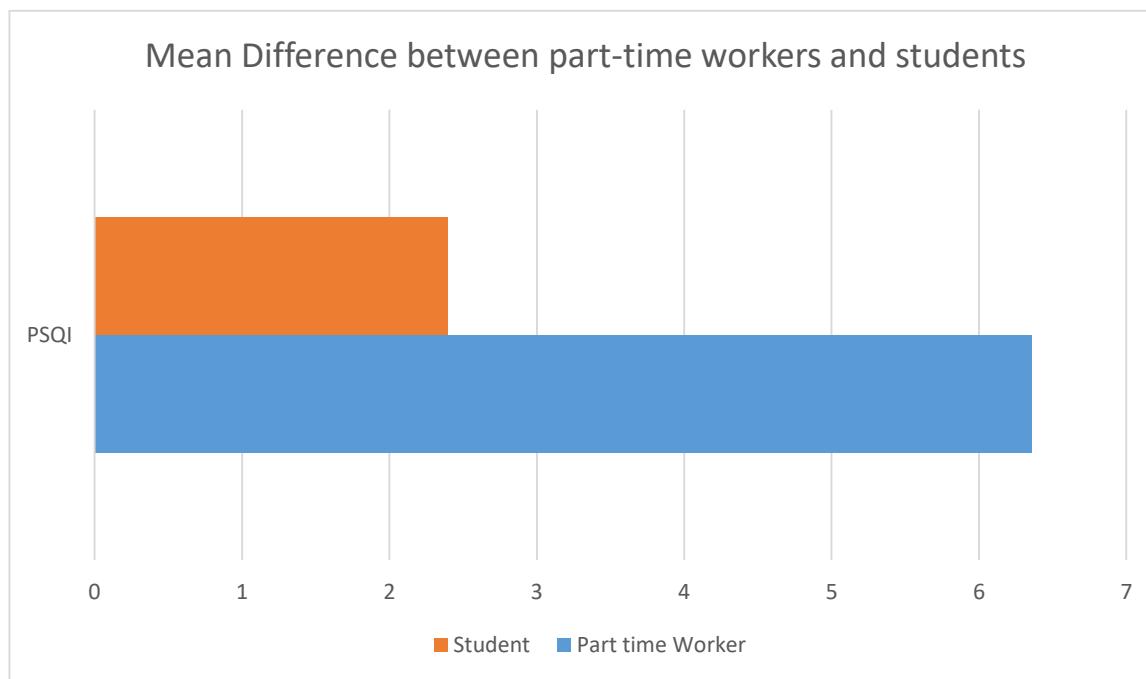


Figure 2. Mean Difference between part-time workers and students

DISCUSSION

The conducted independent samples t-tests and Levene's tests assessed the equality of variances and mean differences between groups in terms of their Pittsburgh Sleep Quality Index (PSQI) scores. In Table 1, which compared females (Group 1) and males (Group 2), Levene's test showed no significant difference in variances between the groups ($F = 0.006$, $p = 0.938$), meeting the assumption of equal variances. Subsequent t-tests assuming equal variances or not yielded similar results, with a non-significant difference in mean PSQI scores between females and males ($t = -0.144$, $df = 108$, $p = 0.886$). The mean difference was negligible at -0.073, and the confidence interval (-1.077 to 0.932) confirmed non-significance, leading to the rejection of hypothesis¹.

In Table 2, comparing part-time workers and students, Levene's test also indicated no significant difference in variances ($F = 0.332$, $p = 0.566$), meeting the assumption of equal variances. The subsequent t-test assuming equal variances or not again yielded non-significant results, with a mean difference of 0.775 ($t = 0.287$, $df = 108$, $p = 0.775$) and a confidence interval of -0.859 to 1.150. These findings showed no statistically significant difference in mean PSQI scores between part-time workers and students, leading to the rejection of hypothesis².

In summary, both analyses demonstrated that there were no significant differences in PSQI scores between the specified groups (females vs. males, part-time workers vs. students), regardless of whether equal variances were assumed or not. These results suggest that gender and employment status as part-time workers or students did not significantly influence sleep quality as measured by the PSQI in this study.

CONCLUSION

The findings of this study provide valuable insights into the sleep quality among young adults, considering gender differences and occupational status. The results indicate that there were no significant differences in sleep quality between males and females, as well as between part-time workers and students. The descriptive statistics for gender-based sleep quality revealed similar mean PSQI scores for females and males, with no statistically significant difference between them. This suggests that gender alone may not be a determining factor in sleep quality among young adults. Further analysis through Levene's test and t-test for equality of means reaffirmed the absence of significant differences in sleep quality between genders, regardless of assumptions about variances.

Comparing sleep quality between part-time workers and students also showed comparable mean PSQI scores, with no significant difference detected through statistical testing. These results lead to the rejection of both hypotheses, indicating that neither gender nor occupational status had a substantial impact on sleep quality in this study's sample. In conclusion, while this study did not find significant differences in sleep quality based on gender or occupational status, it underscores the complexity of factors influencing sleep patterns. Other factors, such as individual sleep habits, stress levels, and lifestyle choices, may play a more significant role in determining sleep quality among young adults. Future research could delve deeper into individual behaviors and environmental factors to develop targeted interventions aimed at improving sleep hygiene and overall well-being among young adults.

Conflict of Interest: The authors certify that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

Funding Source: "There is no funding Source for this study"

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The Study of Breathing Problems Viz-a-Asthma in Patients

Ms. Renuka

Abstract

Effectiveness of RAM's cannula with NIPPV (Non Invasive Positive Pressure Ventilation) Vs Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. Objectives: **1.** To assess effectiveness of RAM's cannula with NIPPV (Non Invasive Positive Pressure Ventilation) on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. **2.** To assess effectiveness of Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. **3.** To compare effectiveness of RAM'S cannula Vs Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. **4.** To associate study findings with selected demographic variables. A quantitative research approach was used for this study. The study was carried in NICU's of hospital at selected area. A quantitative research approach was used for this study. The research design was Non Experimental comparative Descriptive research design. The sample size was adopted for the study is 60 (30 sample in each group) Sampling technique used for study was Non probability Convenience sampling technique. Total 60 samples were taken (30 in each group). The data was collected from 12/12/2021 to 10/01/2022. The Fisher's exact test was used to find association of respiratory distress among neonates diagnosed with moderate respiratory distress with selected demographic variables. p-value corresponding to Period of gestation is small (less than 0.05) demographic variable Period of gestation was found to have significant association with the respiratory distress among neonates diagnosed with moderate respiratory distress. Since p-value corresponding to History of positive pressure ventilation for > 1 minute is small (less than 0.05) so it was found to have significant association with the respiratory distress among neonates diagnosed with moderate respiratory distress.

Keywords RAM's cannula, NIPPV (Non Invasive Positive Pressure Ventilation), Bubble CPAP, respiratory distress, NICU (Neonatal Intensive Care Unit)

Introduction

Every newborn deserves a chance to live. Under Articles 6 and 24 of the Convention on the Rights of the Child (16), every newborn child has the inherent right to life survival and development. The highest attainable standard of health and access to health care services for treatment and rehabilitation of children is not easily accessible. Neonatal Infections (36%), which includes Sepsis Pneumonia, Tetanus and Diarrhoea, Pre-term (28%) and Birth Asphyxia (23%) are the three major causes of neonatal death worldwide. Still there is some variation between countries depending on their care configurations.¹ Respiratory distress is a major contributor to neonatal mortality worldwide. According to research study, the incidence rate of Respiratory Distress Syndrome is approximately 89% among which Respiratory distress is one of the most common causes of NICU admissions among new-borns. Early diagnosis and prompt management of the cause for respiratory distress is important in the management of neonatal distress for better outcome and thus to prevent neonatal morbidity and mortality rates. In spite of recent advances in clinical diagnosis and management there are very less clinical studies on the neonatal respiratory distress in India.² Non- invasive ventilation is defined as any technique that uses constant or variable pressure to provide ventilator support without tracheal intubation. NIV can vary from a simple high flow nasal cannula (NC) to nasal continuous positive airway pressure (NCPAP) to nasal intermittent positive airway pressure ventilation (NIPPV). NIV appears beneficial in the prevention of extubation failures for the initial management of respiratory distress and management of apnoea of prematurity.⁵ Bubble CPAP are available to manage neonates with

moderate respiratory distress, such as blender bubble CPAP. The main function of Bubble continuous positive airway pressure(bCPAP), a non-invasive respiratory support modality used to manage new-borns with respiratory distress, provides continuous pressure that helps prevent de-recruitment of alveoli, increasing the lungs' functional residual capacity, and thus decreasing the work of breathing.³

Need of study

The foetus receives oxygen from the mother blood. The fetal lungs are non-functional during foetal life, the lungs start functioning spontaneously at birth in normal babies and respiration usually stabilizes within a day. Neonatal mortality and morbidity is higher among neonates because of preterm births and LBW. According to few studies out of 103 new born admitted in the NICU, a total of 66 were intubated for 48hrs or more and VAP occurred in 33.3% of the mechanically ventilated neonates. VAP (Ventilator-Associated Pneumonia) was common in mechanically ventilated infants in NICUs and was associated with increased mortality¹³. Premature or ill babies may not start breathing spontaneously or have troubled breathing. This neonate needs mechanical ventilation for oxygenation and stimulates the respiratory system until the baby can breathe adequately on their own. Assisted ventilation had greatly improved the survival rate of preterm babies. But there are more chance to develop Ventilator-Associated Pneumonia in neonates remained a serious and mainly unsolved problem among pediatric and neonatal intensive care units. VAP increases respiratory morbidity and overall mortality and prolongs the hospital length of stay. Invasive modes of respiratory assistance were popular amongst health care system, to prevent such complications there was a need to use other method such as RAM's cannula and Bubble CPAP. Bubble CPAP set is easy to put on CPAP machine, its save time of caregiver to provide ventilation in emergency. CPAP can also be used to deliver higher concentrations of oxygen to premature babies.

So, the researcher felt need to identify the effective management of moderate respiratory distress among neonates which can saves lives, can prevent the complications related to prolong mechanical ventilation, can wean off the neonate from ventilator support and will help the neonate to breathe without efforts with RAM's cannula or Bubble CPAP as an effective management modality of respiratory distress.

Aim of the study

To assess and compare the effectiveness of RAM's cannula Vs Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

Research methodology

The Objectives of study was **1.** To assess effectiveness of RAM's cannula with NIPPV (Non Invasive Positive Pressure Ventilation) on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. **2.** To assess effectiveness of Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. **3.** To compare effectiveness of RAM'S cannula Vs Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. **4.** To associate study findings with selected demographic variables.

A quantitative research approach was used for this study. The study was carried in NICU's of hospital at selected area. A quantitative research approach was used for this study. The research design was Non-Experimental comparative Descriptive research design. Samples are the children aged between Birth to 28 days and admitted in NICU with Moderate respiratory distress at selected area. The sample size was adopted for the study is 60 (30 sample in each group) Sampling technique used for study was Non probability Convenience sampling technique. Tool prepared in three-part Consent form, Modify observation score technique, Assessment of respiratory status. The reliability was done in the selected hospitals of the city, before actual data collection reliability

on 6 samples was done as per set criteria. The Cohen's Kappa reliability test used that suggested result less than 0 shows near perfect agreement and score 1 indicates the tool is perfectly reliable. The calculated reliability by using inter-rater method for this section is 0.82 so the tool is reliable to assess the pain level of an infants.

Through Pilot study shown that the Bubble CPAP is significantly more effective as compared to RAM's cannula on respiratory status among neonates diagnosed with moderate respiratory distress.

Results

The data was analyzed by using inferential and descriptive statistics on the basis of objectives.

Table 4.17: Paired t-test for the effectiveness of RAM's cannula with NIPPV (Non-Invasive Positive Pressure Ventilation) on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

N=30

Day	Mean	SD	T	df	p-value
Day 1	8.7	1.8	-	-	-
Day 2	6.0	2.5	6.5	29	0.000
Day 3	4.3	2.9	9.4	29	0.000
Day 4	3.5	3.1	9.9	29	0.000
Day 5	2.7	3.2	11.1	29	0.000

Average respiratory status score among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals in RAM's cannula with NIPPV group

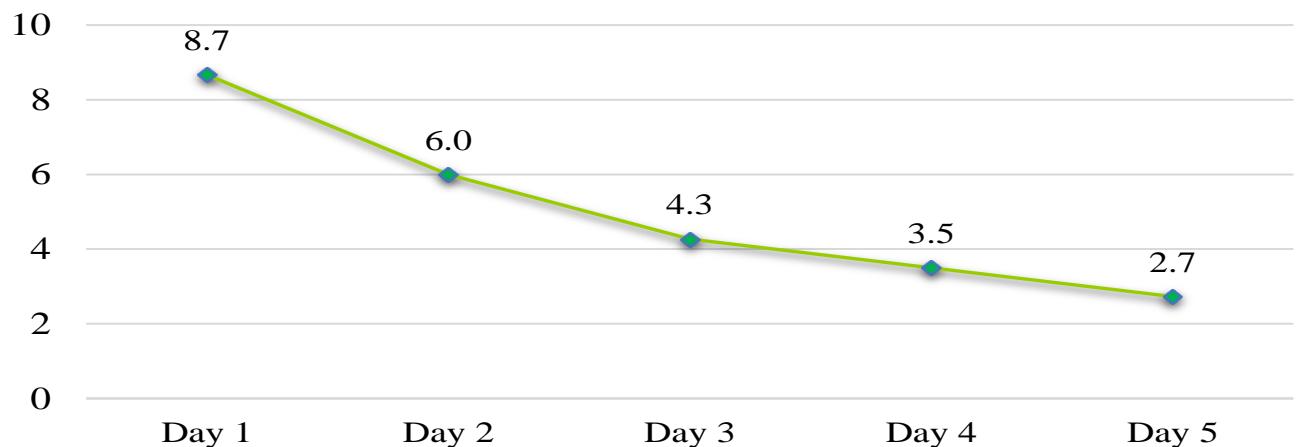


Figure No. 4.17 Line plot showing Paired t-test for the effectiveness of RAM's cannula with NIPPV (Non-Invasive Positive Pressure Ventilation) on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

Above table and graph shows that Researcher applied paired t-test for the effectiveness of RAM's cannula with NIPPV on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. Average respiratory distress scores were 8.7, 6, 4.3, 3.5 and 2.7 on day 1, day 2, day 3, day 4 and day 5. T-value for this test were 6.5, 9.4, 9.9 and 11.1 with 29 degrees of freedom on day 2, day 3, day 4 and day 5. Corresponding p-values were small (less than 0.05) on day 2, day 3, day 4 and day 5. Since p-values on days 2, 3, 4 and 5 are small (less than 0.05), the null hypothesis was rejected. It is evident that the RAM's cannula

with NIPPV is significantly effective on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

Table 4.19: Paired t-test for the effectiveness of Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

N=30					
Day	Mean	SD	T	df	p-value
Day 1	8.5	1.5	-	-	-
Day 2	4.1	2.5	12.0	29	0.000
Day 3	2.2	2.3	16.5	29	0.000
Day 4	1.2	2.0	19.5	29	0.000
Day 5	0.7	1.9	21.5	29	0.000

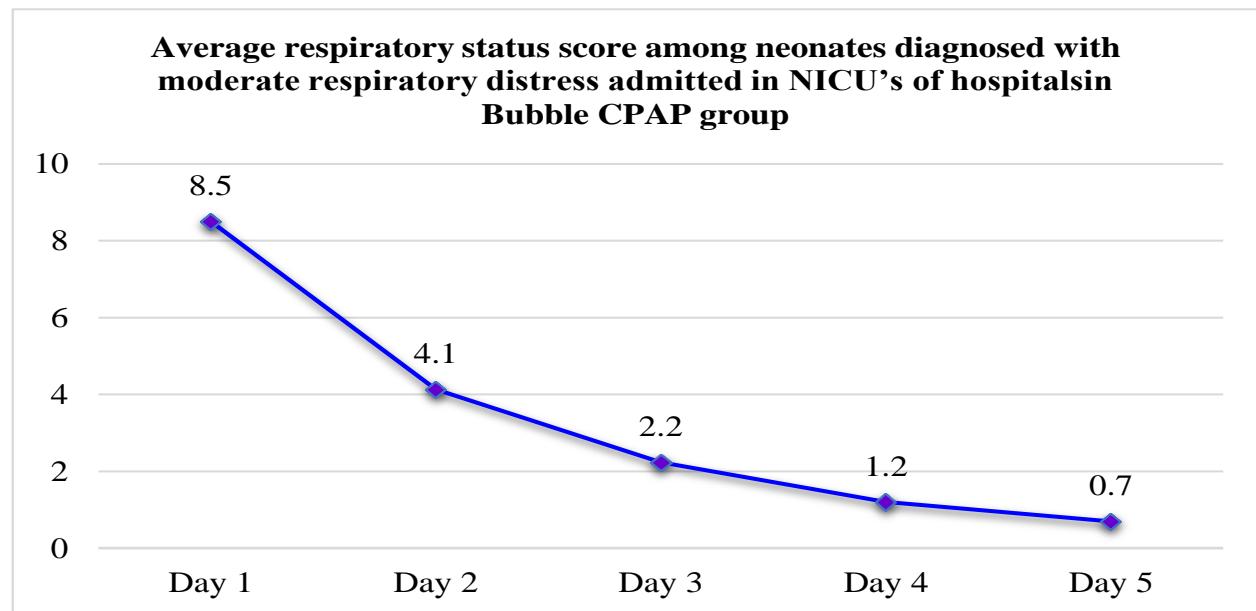


Figure No. 4.19 Line plot showing Paired t-test for the effectiveness of Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

Above table and graph shows that Researcher applied paired t-test for the effectiveness of Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. Average respiratory distress scores were 8.5, 4.1, 2.2, 1.2 and 0.7 on day 1, day 2, day 3, day 4 and day 5. T-value for this test were 12, 16.5, 19.5 and 21.5 with 29 degrees of freedom on day 2, day 3, day 4 and day 5. Corresponding p-values were small on day 2, day 3, day 4 and day 5. Since p-values on days 2, 3, 4 and 5 are small (less than 0.05), the null hypothesis was rejected. It is evident that the Bubble CPAP is significantly effective on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

Discussion

RAM's cannula with NIPPV group, on day 1, 3.3% of the neonates had mild respiratory distress, 26.7% of them had moderate respiratory distress and 70% of them had severe respiratory

distress. On day 5, 83.3% of them had mild respiratory distress, 3.3% of them had moderate respiratory distress and 13.3% of them had severe respiratory distress. This indicates that the respiratory distress improved remarkably after RAM's 135 cannula with NIPPV among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. Bubble CPAP group, on day 1, 46.7% of the neonates had moderate respiratory distress and 53.3% of them had severe respiratory distress. On day 5, 96.7% of them had mild respiratory distress and 3.3% of them had moderate respiratory distress. This indicates that the respiratory distress improved remarkably after Bubble CPAP among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

The comparison of effectiveness of RAM'S cannula Vs Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress, Researcher applied two sample t-test for the comparison of effectiveness of RAMS cannula Vs Bubble CPAP on respiratory distress, In RAM's cannula group, average change in respiratory distress scores were 2.7, 4.4, 5.2 and 5.9 on day 2, 137 day 3, day 4 and day 5. In Bubble CPAP group, average change in respiratory distress scores were 4.4, 6.3, 7.3 and 7.8 on day 2, day 3, day 4 and day 5. Since p-values on days 2, 3, 4 and 5 are small (less than 0.05), the null hypothesis was rejected. It is evident that the Bubble CPAP is significantly more effective as compared to RAM's cannula on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area.

Conclusion

The aim of the study was to compare the effectiveness of RAM's cannula (Non Invasive Positive Pressure Ventilation) Vs Bubble CPAP on respiratory status among neonates 138 diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. The study was based on the general system model. It provides input, process and output. The study made use of Non-experimental descriptive research design. The study population consisted of neonates (birth to 28 days) with moderate respiratory distress, who were admitted in NICU's of hospital at selected area. Total 60 samples (30 in each group) were taken with Non-Probability convenience sampling technique. For generating necessary data, Content validation was done by 11 Experts from different field. The data was collected from 12/12/2021 to 10/01/2022. At the starting of the Study observation was done of the selected hospitals to assess Effectiveness of RAM's cannula with NIPPV (Non Invasive Positive Pressure Ventilation) Vs Bubble CPAP on respiratory status among neonates diagnosed with moderate respiratory distress admitted in NICU's of hospitals at selected area. Samples were selected according to the inclusion criteria and exclusion criteria thus parents were introduced by the investigator. Explained the purpose of the study and assured about confidentiality of the information between the investigator and the respondent. Before Data Collection the consent was taken from the parent. Data was collected from total 60 samples from selected hospitals. Findings were recorded according to the tool. The data was gathered using descriptive and inferential statistics. The Fisher's exact test was used to find association of respiratory distress among neonates diagnosed with moderate respiratory distress with selected demographic variables.

Conflict of Interest

The authors certify that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

Funding Source

Funded by ... (name of Organisation).. or if no write "There is no funding Source for this study"

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Animals and the need for awareness regarding their conservation

Rohit Kumar

Introduction

Animal welfare is important because many animals around the world suffer because of entertainment, food, medicine, fashion, scientific advances, and being used as exotic pets. Every animal deserves to live a good life where they benefit from the five domains i.e. nutrition, environment, health, behaviour and mental state. A sub total of all the living and non living elements and their effects that influence human life is Environment. It is the ideology that evokes the necessity and responsibility of humans to respect, protect, and preserve the natural world from its anthropogenic (caused by humans) afflictions.

Secondary school students are future of Indian and guardians of our environment in future. It is necessary that students must be sensitive and aware about our environment and animal welfare. Here, the researcher developed a natural environment and animal welfare awareness programme for Grade-IX students. In present study, the researcher tried out this program on Grade-IX students and checked its effectiveness.

Objectives

Objectives of present study are mentioned as below.

1. To construct natural environment and animal welfare awareness program for Grade-IX students.
2. To study the effectiveness of natural environment and animal welfare awareness program on Grade-IX students.
3. To study the effectiveness of natural environment and animal welfare awareness program on Grade-IX students in the context of their achievement.
4. To study the effectiveness of natural environment and animal welfare awareness program on Grade-IX students in the context of gender.
5. To study the effectiveness of natural environment and animal welfare awareness program on Grade-IX students in the context of their academic achievement in previous year.

Hypotheses

Hypotheses of present study are as follow.

H0₁ There is no significant difference between mean scores of post-test obtained by students of experimental and controlled groups

H0₂ There is no significant difference between mean scores of post-test obtained by boys of experimental and controlled groups.

H0₃ There is no significant difference between mean scores of post-test obtained by girls of experimental and controlled groups.

H0₄ There is no significant difference between mean scores of post-test obtained by students having higher achievement of experimental and controlled groups.

H0₅ There is no significant difference between mean scores of post-test obtained by students having lower achievement of experimental and controlled groups.

Limitations

Limitations of present study are given as below.

1. Present study was conducted in a New Shayona School selected from Ahmedabad city.
2. The researcher constructed natural environment and animal welfare programme. Thus, all the limitations of this program were the limitations of this study.
3. The researcher constructed post-test. Thus, all the limitations of this post-test were the limitations of this study.

Research Method

In present study, the researcher checked effectiveness of awareness program constructed by researcher. To fulfil this purpose, the researcher used experimental research method in which only post-test equivalent groups experimental research design was used.

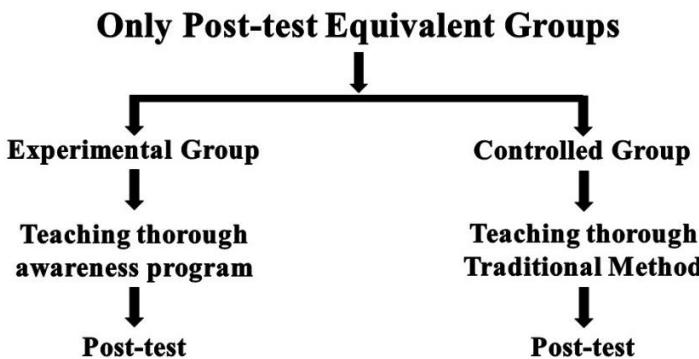


Figure 1: Experimental Design

Research Tool

The researcher used awareness programme and post-test as research tools:

1. Natural Environment and Animal Welfare Program

The researcher constructed an awareness program comprising different activities like group discussion, film video, lecture, nature walk, drawing, plantation, etc.

2. Post-test

Post-test consist of MCQ types 50 questions. Each question has four responses out of which only one response is correct, other three are incorrect. Each question is of 1 mark. Thus, total 50 marks are assigned for whole test.

Research Sample

The researcher selected 80 students from New Shayona school. Out of these 40-40 students were divided in two different groups. The researcher used pair match method to divide them. The researcher divided students on basis of their previous year's (Grade-VIII) total marks of annual exam. The researcher calculated median of their previous year's total marks and again divided them in high and low level according to their achievement. The students having marks more than median were assigned as high achievement and students having marks less than median were assigned as low achievement.

Table 1.0

Sample of the Study

Group	Experimental		Controlled		Total
Gender / Achievement	Boys	Girls	Boys	Girls	

High	8	13	8	11	40
Low	12	7	12	9	40
Total	20	20	20	20	80
	40		40		

Data Collection

The researcher conducted a 15 days experimentation on students of both groups. Students of experimental group were treated with natural environment and animal welfare program and students of controlled group were treated with traditional teaching method. After experimentation students of both groups were given post-tests. Post-test was of 50 marks having 50 MCQ based questions. The students were given 50 minutes to complete this test. After test, all answer sheets were collected by the researcher.

Data Analysis

The researcher carefully checked all answer sheets and gave each student a score of marks. Later these scores were used for data analysis. The researcher constructed five hypotheses. These hypotheses were tested using t-tests between mean scores of students of experimental group and controlled group. The results of t-tests are presented in below tables.

H0₁ There is no significant difference between mean scores of post-test obtained by students of experimental and controlled groups

Table 2.0

Result of t-test between mean scores of posttests obtained by students of experimental and controlled groups

Group	N	M	SD	SED	t	Significance
Experimental	40	40.98	4.29	1.19	8.58	0.01
Controlled	40	30.73	6.21			

df	0.05	0.01
78	1.99	2.64

According to table 4.10, calculated t-value is 8.58. For df=78, table t-values are 1.99 at 0.05 level and 2.64 at 0.01 level. Here, calculated t-value is more than table t-values at both levels. Thus, hypothesis H_{0₁} is rejected and there is a significant difference between mean scores of students of experimental and controlled groups.

Now, mean score of students of experimental group obtained in post test is 40.98 and mean score of students of controlled group obtained in posttest is 30.73. Therefore, mean score of students of experimental group is more than mean score of students of controlled group. This revealed that Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on students of Grade- IX.

H0₂ There is no significant difference between mean scores of post-test obtained by boys of experimental and controlled groups.

Table 3.0

Result of t-test between mean scores of posttests obtained by boys of experimental and controlled groups

Boys	N	M	SD	SED	t	Significance
Experimental	20	40.50	4.31	1.79	5.63	0.01

Controlled	20	30.40	6.76			
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df	0.05	0.01
38	2.02	2.71

According to table 4.13, calculated t-value is 5.63. For df=38, table t-values are 2.02 at 0.05 level and 2.71 at 0.01 level. Here, calculated t-value is more than table t-values at both levels. Thus, hypothesis H02₁ is rejected and there is a significant difference between mean scores of boys of experimental and controlled groups.

Now, mean score of boys of experimental group obtained in posttest is 40.50 and mean score of boys of controlled group obtained in posttest is 30.40. Therefore, mean score of students of experimental group is more than mean score of boys of controlled group. This revealed that Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on boys of Grade- IX.

H0₃ There is no significant difference between mean scores of post-test obtained by girls of experimental and controlled groups.

Table 4.0

Result of t-test between mean scores of posttests obtained by girls of experimental and controlled groups

Girls	N	M	SD	SED	t	Significance
Experimental	20	41.45	4.33			
Controlled	20	31.05	5.77	1.61	6.44	0.01

df	0.05	0.01
38	2.02	2.71

According to table 4.16, calculated t-value is 6.44. For df=38, table t-values are 2.02 at 0.05 level and 2.71 at 0.01 level. Here, calculated t-value is more than table t-values at both levels. Thus, hypothesis H0₃ is rejected and there is a significant difference between mean scores of girls of experimental and controlled groups.

Now, mean score of girls of experimental group obtained in posttest is 41.45 and mean score of girls of controlled group obtained in posttest is 31.05. Therefore, mean score of girls of experimental group is more than mean score of girls of controlled group. This revealed that Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on girls of Grade- IX.

H0₄ There is no significant difference between mean scores of post-test obtained by students having higher achievement of experimental and controlled groups.

Table 5.0

Result of t-test between mean scores of posttests obtained by students having higher achievement of experimental and controlled groups

High	N	M	SD	SED	t	Significance
Experimental	21	43.81	2.65			
Controlled	19	36.11	2.94	0.89	8.66	0.01

df	0.05	0.01
38	2.02	2.71

According to table 4.19, calculated t-value is 8.66. For df=38, table t-values are 2.02 at 0.05 level and 2.71 at 0.01 level. Here, calculated t-value is more than table t-values at both levels. Thus, hypothesis H04 is rejected and there is a significant difference between mean scores of students having higher achievement of experimental and controlled groups.

Now, mean score of students having higher achievement of experimental group obtained in posttest is 43.81 and mean score of students having higher achievement of controlled group obtained in posttest is 36.11. Therefore, mean score of students having higher achievement of experimental group is more than mean score of students of controlled group. This revealed that Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on students having higher achievement of Grade- IX.

H05 There is no significant difference between mean scores of post-test obtained by students having lower achievement of experimental and controlled groups.

Table 6.0

Result of t-test between mean scores of posttests obtained by students having lower achievement of experimental and controlled groups

Low	N	M	SD	SED	t	Significance
Experimental	19	37.84	2.87	1.07	11.15	0.01
Controlled	21	25.86	3.89			

df	0.05	0.01
38	2.02	2.71

According to table 4.22, calculated t-value is 11.15. For df=38, table t-values are 2.02 at 0.05 level and 2.71 at 0.01 level. Here, calculated t-value is more than table t-values at both levels. Thus, hypothesis H05 is rejected and there is a significant difference between mean scores of students having lower achievement of experimental and controlled groups.

Now, mean score of students having lower achievement of experimental group obtained in posttest is 37.84 and mean score of students having lower achievement of controlled group obtained in posttest is 25.86. Therefore, mean score of students having lower achievement of experimental group is more than mean score of students having lower achievement of controlled group. This revealed that Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on students having lower achievement of Grade- IX.

Major Findings

On the basis of results of t-tests, following major finding could be derived:

1. Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on students of Grade- IX.
2. Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on boys of Grade- IX.
3. Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on girls of Grade- IX.
4. Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on students having higher achievement of Grade- IX.

5. Natural Environment and Animal Welfare Awareness programme constructed by the researcher is very effective on students having lower achievement of Grade-IX.

Final Thoughts

A good climate, accessible clean water, fertile soil, etc. are aspects of the physical environment that enable people to live and thrive. However, harsh environments, such as very hot climates, limited water and infertile land, make it more difficult for people to survive. In present study, the researcher constructed and tryout Natural Environment and Animal Welfare program on students of Grade-IX. The researcher conducted an experiment in which one group of students was treated with awareness program and another group of students was treated with traditional teaching method. The results revealed that the Natural Environment and Animal Welfare program is very effective of students of Grade-IX.

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The Significance of Breast Feeding

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Abstract

The breast crawl describes what occurs when a newborn baby is placed on their birth parent's chest or belly immediately after birth and given time to find the parent's nipple and begin to feed on their own. A study conducted to assess barriers of breast crawl for early initiation of breast feeding in newborn after delivery and to assess effect of breast crawl for early initiation of breast feeding in newborn after delivery. Posttest only control group Experimental research design was used. In this study sample size was 60 samples (30 Experimental & 30 Control group). Result shows that In experimental group 53.3% of them had age 19-24 and 46.7% of them had age 25-30, 63.3% of them had primigravida and 36.7% of them had multigravida, 100 % of them had institutional delivery, 93.3% of them had any other diseases and 3.3% of them PIH and asthma, 80% of them had normal vaginal delivery and 20% of them LSCS delivery. In control group 80 % of them had age 25-30. and 20% from age 9-24 , 56.7% of them had primigravida and 43.3% of them had multigravida, 93.3% of them had institutional delivery and 6.7 % home delivery, 86.7% of them had any other diseases and 6.7% of them PIH and asthma, 83.3 % of them had normal vaginal and 16.7 % of them LSCS delivery. In Experimental group Positioning, Attachment, Sucking, Swallowing and Duration had 70% effect of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city. Baby achieving quick latch with good amount of breast tissue in mouth (40%), Able to establish sucking pattern on both breast (40%) and Audible sound (40%) had major effect in Experimental group for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals. Researcher applied 't' test for the significance of difference. The mean effect of breast crawl for early initiation of breast feeding is statistically significant at p-value 0.0001; therefore, Breast crawl helps for early initiation of breast feeding after delivery.

Keywords Breast crawl, Breastfeeding, Newborns, Barriers, Delivery

Introduction

Every newborn, when placed on mother's abdomen soon after birth, has the ability to find its mother's breast all on its own and to decide when to take the first breast feed. This is called Breast Crawl. In India Breast Crawl was first experimented and continued as a method to initiate breast feeding in 'Grace Maternity Home', Mumbai. The Breast crawl is associated with a variety of sensory, central, motor and neuro-endocrine components, all directly or indirectly helping the baby to move and facilitate her survival in the new world. Everything in Breast Crawl is perfectly designed by nature. The skin-to-skin contact helps the baby to remain warm and initiates mother-baby bonding. The baby smells food close by, begins salivating, reaches areola and initiates breast feeding by it. Recent behavioral and physiological observations found that infant and mother are ready to begin interacting in the first few minutes of life and also observed infant's ability to crawl towards mother's breast to initiate breast feeding by itself.

The promotion of early initiation of breast feeding has great potential: 16% of neonatal deaths could be saved if all infants were breastfeed from day 1 and 22% if breastfeeding were started within the first hour after birth. All these advantages will obviously be maximally tapped with Breast crawl. Breast Crawl has tremendous potential to change initiation practices. Initiation of breastfeeding by the Breast Crawl is a critical component of the IYCF (Infant and Young Child

Feeding) initiative for the state of Maharashtra, India. Improved IYCF practices promote optimal growth and development, prevent malnutrition and improve child survival.

Need of The Study

Breast feeding the 1st hour - saves one million babies. The first hour after birth has a major influence on the survival, future health, and wellbeing of a newly born infant. The basic needs of a baby at birth are warmth, normal breathing, mother's milk and protection from infection. Early initiation of breast feeding serves as the starting point for a continuum of care for mother and newborn that can have long lasting effects on health and development. Breast feeding is a natural human activity. Many health personnel in maternity services are unaware of implementing BFHI (Baby Friendly Hospital Initiative) recommendation of early initiation of breast feeding within one hour of birth. As a result, initiation of breast feeding is often delayed. Even in those places where health professionals are well informed and keen in early initiation of breast feeding programme, awareness of Breast Crawl is lacking. Breast Crawl was described 20 years ago. It is a simplest method that provides prolonged skin-to-skin contact and will culminate in first breast feed. It is easy, does not require elaborate preparations, can be done in any settings and is readily reproducible.

Recently a group of care givers and community workers in Nandurbar District of Maharashtra, witnessed a demonstration of newborn performing Breast crawl. After the demonstration, all were so impressed that they decided to make the method part of their routine. In order to advance this initiative, UNICEF has partnered with various state and public health institutions such as Breast Feeding Promotion Network of India (BPNI) and is distributing an instructional film on Breast Crawl with specifics an each steps. WHO and UNICEF recommended early initiation of breast feeding which results in lower neonatal mortality.

Aim of The Study

Aim of the study to assess barriers and effect of breast crawl for early initiation of breast feeding in newborn after delivery.

Materials & Methods

A study conducted to assess barriers and effect of breast crawl for early initiation of breast feeding in newborn after delivery in the labor unit of the selected hospitals of Pune city. Objectives of the study were to assess barriers of breast crawl for early initiation of breast feeding in newborn and to assess effect of breast crawl for early initiation of breast feeding in newborn after delivery. Post only control group Experimental research design used as research design. Setting was Labour room of selected hospitals of city. Duration of the study was 30 Days. In this study sample size was 60 mothers and newborns (30 Experimental & 30 Control group). All Normal delivery PNC Mother & Newborn admitted at selected Maternity hospitals of city. Only Normal delivery PNC mother & New-born included in this study. Mother who was having any critical illnesses was excluded from study. 2 Hospitals were selected for Pilot and Final study separately. Tool was included with age, gravida, education, occupation, lace of delivery, medical diseases and mode of delivery as demographic variables. Content Validity of the tool was done by 9 experts. Reliability was conducted on 129 samples with reliability score was found 0.85 with r parsons correlation coefficient formula and test retest method. Pilot study was done in different setting from main study on same samples of reliability and test (First score of test retest method.) score was taken for same. Informed consent was taken from the participants. The Information given by the subjects is kept confidential. Data Generated during the research process, is used extensively for Benefits of the Profession.

Result

Section III: Checklist for assess the barriers of initiation of Breast Feeding in Baby Crawl
Table No. : Table showing barriers of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city. (EXPERIMENTAL GROUP)

N=30

SR. NO.	BARRIERS	YES		NO	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Expected recovery time from spinal anesthesia.	4	13.3	26	86.7
2	Uncomfortable Breast Feeding position due to pain.	18	60	12	40
3	Mothers poor knowledge of Breast Feeding	22	73.3	8	26.7
4	Insufficient attention	5	16.7	25	83.3
5	Unconsciousness after delivery	2	6.7	28	93.3
6	Hypertension	3	10	27	90
7	Generalized weakness/illness	19	63.3	11	36.7
8	Non acceptance of relatives	6	20	24	80

Barriers of Breast Crawl for early initiation of breast feeding in newborns after delivery (Experimental Group)

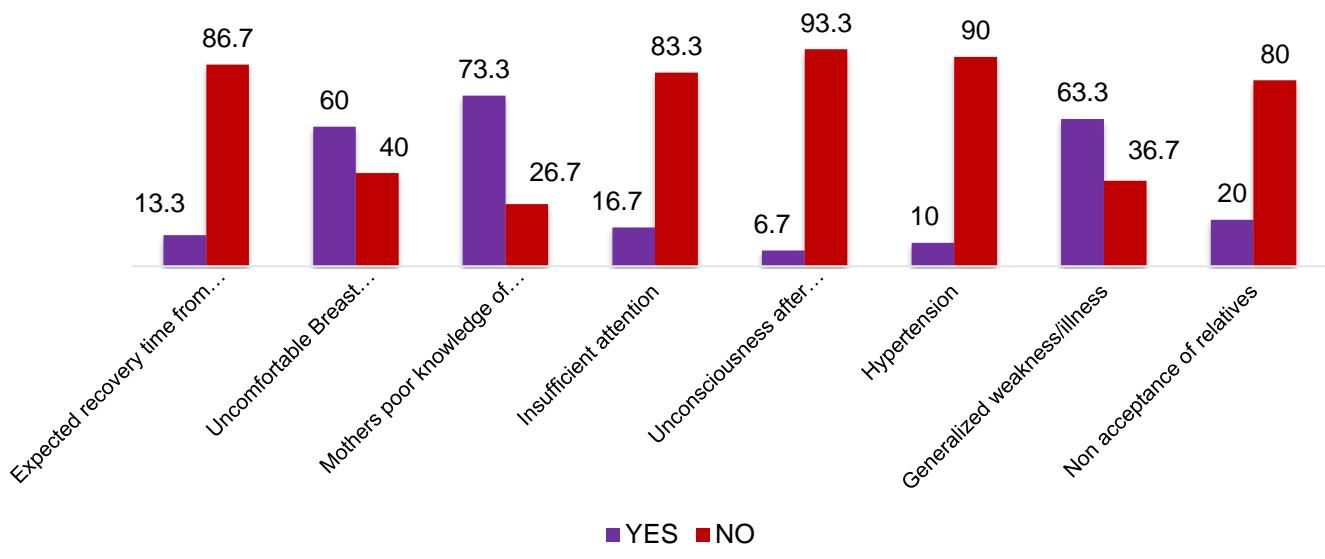


Figure No. Bar diagram showing barriers of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city.

Above table and figure shows that 73.3% mother had poor knowledge of breast feeding.

Table No. : Table showing barriers of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city. (CONTROL GROUP)

N=30

SR. NO.	BARRIERS	YES		NO	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Expected recovery time from spinal anesthesia.	20	66.7	10	33.3
2	Uncomfortable Breast Feeding position due to pain.	22	73.3	8	26.7
3	Mothers poor knowledge of Breast Feeding	25	83.3	5	16.7
4	Insufficient attention	22	73.3	8	26.7
5	Unconsciousness after delivery	0	0	30	100
6	Hypertension	3	10	27	90
7	Generalized weakness/illness	21	70	9	30
8	Non acceptance of relatives	21	70	9	30

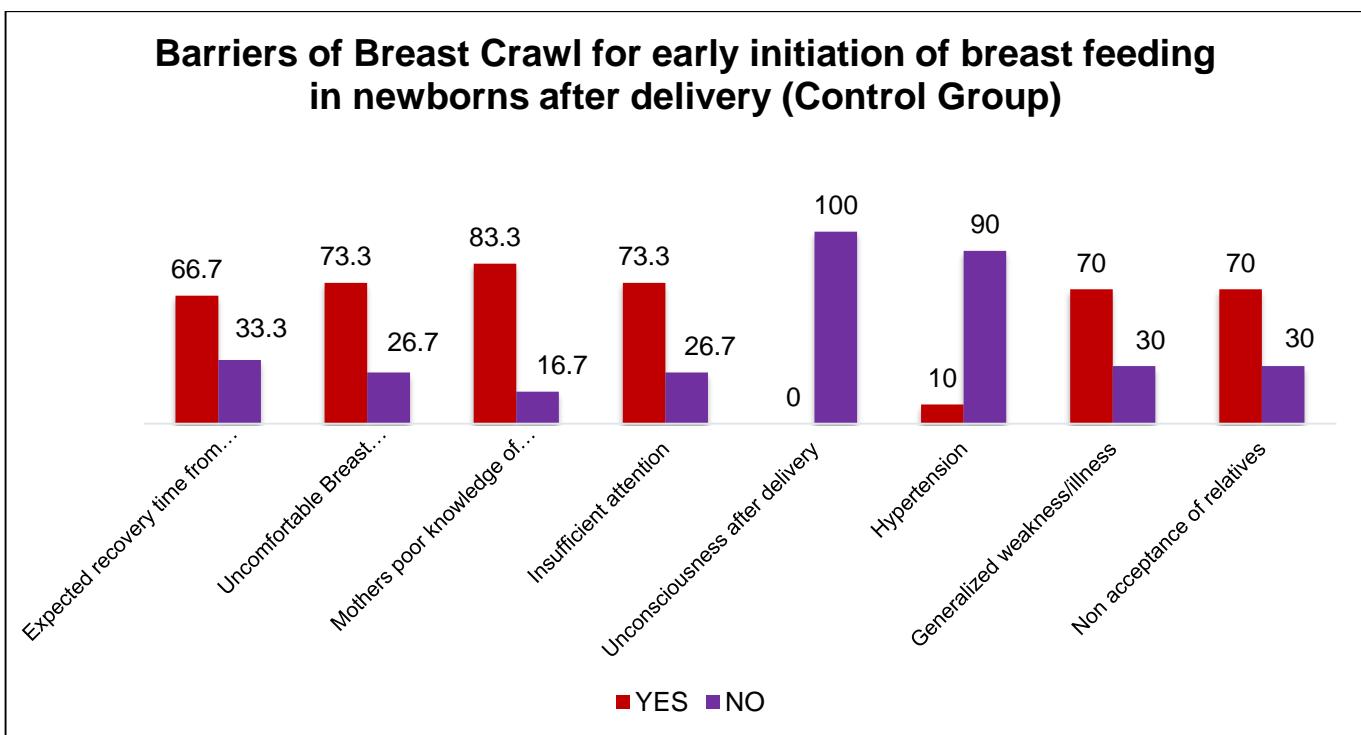


Figure No. Bar diagram showing barriers of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city.

Above table and figure shows that 83.3% mother had poor knowledge of breast feeding.

Table No. : Table showing comparison between experimental and control group.

N=30

SR. NO.	EFFECT	EXPERIMENTAL GROUP		CONTROL GROUP	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	POSITIONING				
i)	Baby well supported and placed on abdomen of mother near to breast	21	70	18	60
ii)	Lying on side / Neck not twisted	21	70	14	46.7
iii)	Mother's confidently handling baby	21	70	13	43.3
2.	ATTACHMENT				
i)	Positive rooting reflex	21	70	13	43.3
ii)	Wind open mouth	21	70	16	53.3
iii)	Baby achieving quick lach with good amount of breast tissue in mouth	21	70	12	40
iv)	Baby stays attach with a good lach throughout feed	21	70	13	43.3
v)	Chin touches to the breast	21	70	17	56.6
vi)	Lower lip is everted	21	70	14	46.7
3.	SUCKING				
i)	Able to establish sucking pattern on both breast	21	70	12	40
ii)	Letting down sensation to mother	21	70	18	60
4.	SWALLOWING				
i)	Audible sound	21	70	12	40
5.	DURATION				
i)	>25 minutes	21	70	13	43.3

COMPARISON BETWEEN EXPERIMENTAL AND CONTROL GROUP

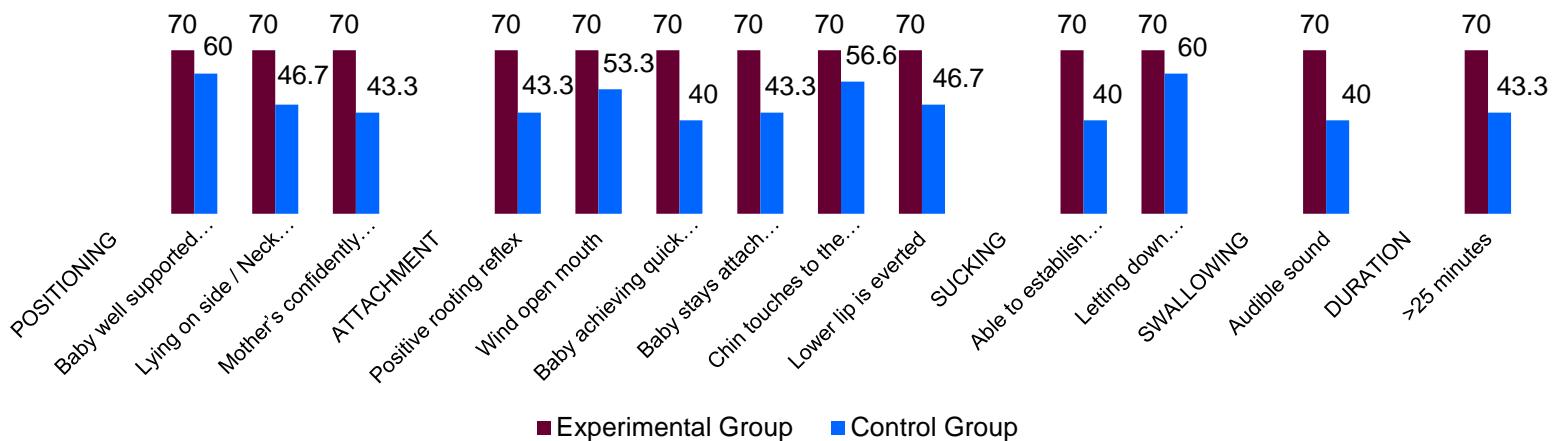


Figure No. Bar diagram showing comparison between Experimental group and Control group.

Above table and figure shows Baby achieving quick latch with good amount of breast tissue in mouth (40%), Able to establish sucking pattern on both breast (40%) and Audible sound (40%) had major effect in control group for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city.

Table No. : Table showing significance of difference with effect of breast crawl and without effect for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city. N=30

Group	Mean	SD	p Value (Unpaired t test)
Experimental Group	21.00	0.00	
Control Group	14.23	2.24	0.0001

Researcher applied 't' test for the significance of difference with effect of breast crawl and without effect of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city. The mean effect of breast crawl for early initiation of breast feeding is statistically significant at p-value 0.0001; therefore, Breast crawl helps for early initiation of breast feeding after delivery.

Discussion

A study conducted to assess barriers of breast crawl for early initiation of breast feeding in newborn after delivery and to assess effect of breast crawl for early initiation of breast feeding in newborn after delivery. Posttest only control group Experimental research design was used. In this study sample size was 60 samples (30 Experimental & 30 Control group). Result shows that In experimental group 53.3% of them had age 19-24 and 46.7% of them had age 25-30, 63.3% of them had primigravida and 36.7% of them had multigravida, 100 % of them had institutional delivery, 93.3% of them had any other diseases and 3.3% of them PIH and asthma, 80% of them had normal vaginal delivery and 20% of them LSCS delivery. In control group 80 % of them had age 25-30. and 20% from age 9-24 , 56.7% of them had primigravida and 43.3% of them had multigravida, 93.3% of them had institutional delivery and 6.7 % home delivery, 86.7% of them had any other diseases and 6.7% of them PIH and asthma, 83.3 % of them had normal vaginal

and 16.7 % of them LSCS delivery. In Experimental group Positioning, Attachment, Sucking, Swallowing and Duration had 70% effect of breast crawl for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals of Pune city. Baby achieving quick latch with good amount of breast tissue in mouth (40%), Able to establish sucking pattern on both breast (40%) and Audible sound (40%) had major effect in Experimental group for early initiation of breast feeding in newborns after delivery in the labor unit of the selected hospitals. Researcher applied 't' test for the significance of difference. The mean effect of breast crawl for early initiation of breast feeding is statistically significant at p-value 0.0001; therefore, Breast crawl helps for early initiation of breast feeding after delivery.

Conclusion

The breast crawl describes what occurs when a newborn baby is placed on their birth parent's chest or belly immediately after birth and given time to find the parent's nipple and begin to feed on their own. This phenomenon was first described in 1987 in Sweden at the Karolinska Institute. Birth practices can affect breastfeeding, particularly initiation. If the mother is not immediately able to begin SSC, her partner or other helper can assist or place the infant SSC on their chest or breast. It is recommended that SSC be facilitated immediately after birth, as this is the time when the newborn is most likely to follow its natural instincts to find and attach to the breast and then breastfeed. To find the nipple, the newborn uses a variety of sensory stimuli: visual (the sight of the mother's face and [areola](#)), auditory (the sound of its mother's voice), and olfactory (the scent of the areola, which resembles that of [amniotic fluid](#)).

Therefore, Breast Crawl is a beneficial practice that promotes immediate initiation of breastfeeding thereby it reduces the immediate new-born weight loss in initial days. Hence forth this can be made as a universal practice to protect the health of coming generations.

Conflict of Interest

The authors certify that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

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Women Empowerment in India

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Abstract

In this research paper, we have to explore about the “Importance of Women Empowerment in India: A Study of Economic Perspective”. It all comes down to power, choice, and transformation. It is a process of transformation that gives weaker or powerless people and groups the opportunity to make decisions that have an impact on their life. Women empowerment is the process of giving women the authority they need to know their rights and carry out their obligations to others and themselves as effectively as possible. According to A.P.J. Abdul Kalam, women's empowerment is crucial to building a respectable nation because it ensures a stable society. It has been agreed that without women's empowerment, a decent country cannot improve due to the concerns and value systems of the women. The 73rd Amendment mentioned efforts to empower women.

Keywords: **Empowerment, Panchayats, Participation, Economic development, Amendment.**

Introduction:

It all boils down to change, power, and choice. It is a process of change that offers less powerful individuals and groups the chance to make choices that will affect their lives. Giving women the authority they need to understand their rights and fulfill their responsibilities to others and to themselves as best they can is the process of empowering women. A.P.J. Abdul Kalam asserts that women's empowerment is essential to creating a respectable nation since it guarantees social stability. It is widely acknowledged that a civilized country cannot advance without the empowerment of women because of their concerns and value systems. Efforts to empower women were included in the 73rd Amendment.

Wives were held in high regard during the Vedic Era. She was seen as half of the man—his confidante, buddy in times of need, counselor in the woods, and the other half—as they navigated life's challenges together. The women were given the chance to achieve high standards in both intellect and spirituality. Throughout this time, there were a lot of female Rishis. Although polygamy was practiced by the wealthier classes of society, monogamy was still prevalent. Early marriage and the sati system did not exist. But after the Later-Vedic era, women began to face discrimination in education and other areas, while still maintaining free and prestigious roles in the Rig-Vedic society. The status of women was further deteriorated by child marriage, polygamy, widow burning, or sati, and the purdah. The customs of Indian culture.

Women Empowerment:

It all comes down to power, choice, and transformation. It is a process of transformation that gives weaker or powerless people and groups the opportunity to make decisions that have an impact on their life. Women empowerment is the process of giving women the authority they need to know their rights and carry out their obligations to others and themselves as effectively as possible.

“Women empowerment is any process that provides greater autonomy to women through the sharing of relevant information and provision of control over factors affective to their performance,” state K. Sayulu, G. Sardar, and B. Sridevi (2005).

Objectives

The study has following objectives:

1. To study the necessity of women empowerment.
2. To study the status of women and efforts made in present
3. To study the importance of women empowerment in India.

Methodology

The study mainly based on secondary data. The current scenario of rural education has been analyses on the basis of published works like Journals, Reports, Articles and research papers etc.

Literature Review

Ponraj and Gnanaguru (2016). Women contribute significantly to the advancement of the economy and society. Women are the family's organizers, leaders, trainers, and labor providers. They also contribute significantly to the growth of the agricultural, industrial, and service sectors. However, women's status is extremely low, and women are more likely than males to be destitute. The only way to solve every issue is to empower women. A woman's potential power can be used for economic development if she is empowered and educated. The concept of empowerment envisions individuals fully engaged in the decision-making process that influences their life. Without the advancement and empowerment of women, inclusive growth and human development cannot be realized. This essay discusses the necessity, goals, and significance of women.

Seema Singh and Antra Singh (2020). Because this is a classic patriarchal society, women are viewed as second-class citizens in the political, social, and economic arenas. However, stakeholders have always given women's equality and empowerment first priority and have taken great care in this regard. The study looks closely at India's position in relation to other nations and aims to determine whether or not the nation is ready to meet UN Sustainable Development Goal No. 5. The study builds its case using secondary sources, including reviews of previously published works in journals, books, reports from different NGOs, government agencies, and websites that feature content from these and other international organizations. This study conducts a critical analysis of the models and dimensions of women's empowerment in India. Indicators of women's empowerment, government policies and programs, and constitutional safeguards were all covered in the study. Still, the nation comes in last when compared to other nations. Programs must be reevaluated and altered in order to meet SDG-5 by 2030.

Sweety Jain (2022). Sustainable development cannot be achieved without the empowerment of women. In order for a life to be productive and reproductive, both men and women must fully participate and partner. Due to their lack of authority and influence, combined with their heavy workloads, women over the world are facing dangers to their lives, health, and well-being. The current state of women's empowerment is incredibly uneven between the many societal segments. Promoting women's rights, attaining empowerment, improving women's general standard of living, and elevating their social standing all depend heavily on literacy. There is still a large vacuum that has to be addressed by establishing better laws and policies and raising awareness among the public. Many steps have been taken to empower women, including passing laws and implementing regulations.

Characteristics of Women Empowerment

Women empowerment possesses certain characteristics. They are the following:

1. Women empowerment enables a greater degree of self-confidence and a sense

of independence among women.

2. Women empowerment is a process of acquiring power for women in order to understand her rights and to perform her responsibilities towards oneself and others in a most effective way.

3. Women empowerment enables women's to organize themselves to increase their self-reliance.

4. Women empowerment provides greater autonomy to women.

5. Women empowerment means women's control over material assets, intellectual resources and ideology.

6. Women empowerment abolishes and structures of society.

7. Women empowerment means participation of women in policy and decision making process at domestic and public levels.

8. Empowerment of women enables women to realize their full identity and powers in all spheres of life.

9. Empowerment also means equal status to women.

10. Women empowerment occurs within sociological, psychological, political, cultural, familial and economic spheres and at various levels such as individual, group and community.

11. Women empowerment is a process of creating awareness and capacity building.

Status of Women in India

An Indian woman had four statuses traditionally. These were mother, homemaker, wife, and daughter. In society, women's status was set. However, women's standing is evolving in the current era. They are engaged in political, social, and economic activities. They obtained better training, jobs, pay, and prestige in addition to these benefits. The development of the health and education sectors can be attributed to women for a number of social, economic, and cultural reasons. Some of the main causes of women's achievement include historically favorable conditions, progressive social movements, and government policy. The factors that are directly related to women's empowerment, such as female literacy and labor force participation rates, are what cause the decrease in gender gaps throughout economic growth. Public action in the areas of education, women's ownership, and political involvement are necessary to support these. Having access to education was essential for giving women employment options or even for empowering unemployed housewives.

Importance of Women Empowerment

Women's empowerment is an ongoing and dynamic process that enhances their ability to alter the systems and conditions that impede them and permits them to participate in decision-making related to all financial, political, and social processes in society. With the 73rd Amendment's implementation, the state backed an initiative for women's empowerment that reserved 33% of seats in panchayats and workplaces for women. During the period of women's empowerment in India, Panchayat reservation was considered a significant turning point. When women make up half of the population, it is imperative that they be empowered in order to sustain the nation's economic progress. Empowering women is crucial for creating a civilized country, as former President A.P.J. Abdul Kalam said, since it ensures a stable community. Since women's concerns and values contribute to the development of a decent nation, it is understood that women's empowerment is essential. Similar circumstances have arisen in India as a result of international initiatives supporting women's empowerment, where the advancement of women has been given top priority. 2001 was declared "Women's

Empowerment Year," notwithstanding earlier initiatives focusing on the welfare of women exclusively.

In India, a national policy for women's empowerment was unveiled in 2001. In 2003–04, a national plan of action for women's empowerment was put into place in order to properly actualize it. The Tenth Five Year Plan had a concerted approach for women's empowerment with clear goals, targets, and a timeline (2002-07). Given that social as well as economic elements influence women's empowerment, the government has implemented a number of initiatives, including programs and policies, to ensure the viability of the current system. The Prenatal Diagnostic Techniques Amendment Act, 2003, the Hindu Succession Act, the Sati Prevention Act, the National Rural Employment Guarantee Act, and the Protection of Women from Domestic Violence Act. The government has attempted to improve financial status and gender equality through a number of programs, some of which are actualized under the ministry of Support for Training and Employment Program (STEP), Kishori Shakti Yojana, the nutrition program for pre-adult young ladies, and Rashtriya Mahila Kosh, which provides small-scale credit.

Empowerment of Women through Education, Skilling & Micro-Financing

(1) Education:

- To guarantee girls' rights to an education and their freedom from discrimination in educational institutions, the policy on education must be more comprehensive. Education policy should also focus on influencing young men's and boys' favorable views about women and girls.
- Relatively stronger financial incentives for girls' education up until Class XII are required in order to reduce the higher dropout rate among them.
- Families with two girls should be eligible for the Post Graduate Indira Gandhi Scholarship, which is now only available to single girl children.
- Villages and districts that are successful in achieving an equal child-to-sex ratio through initiatives for education, information, and communication should be rewarded.
- Strict adherence to laws that prioritize the empowerment of women via education is required.
- More focus needs to be placed on e-governance in order to provide prompt oversight of the money disbursed by the federal government and the various state governments for scholarships for female students.
- Hostels should have gender-neutral amenities for security reasons.

(2) Skilling:

- It is necessary to support the skill development of women working in non-traditional fields like plumbing and electrical in order to empower them to become self-sufficient.
- To increase their bargaining power, women can be arranged into various professional groups.
- Digital India and other platforms should be leveraged for branding and marketing, as well as for connecting with consumers, markets, and corporations.
- In addition to government initiatives, NGOs and other organizations should give women employable skills and training to enable them to pursue other respectable jobs where they may make a good living.

(3) Micro-Finance

- Organizations that support women's empowerment must intervene in the market and value chain to offer livelihood possibilities.
- Regulations and policies ought to be designed in a way that facilitates credit facilities acquisition for female businesses.
- The government ought to encourage women to start self-help groups.
- Industry-specific goals for women's employment are required, and firms should be encouraged to execute them.
- Companies who hire thirty percent women workers ought to receive tax benefits.

Women Empowerment in India

Women should be empowered if they are to be self-sufficient, independent economically, to have high self-esteem so they can handle any challenging circumstances, and to be allowed to take part in development initiatives. The government has implemented many programs and schemes for women's welfare, such as the Food and Nutrition Board (FND), National Credit Fund for Women (1993), Information and Mass Education (IMF), etc.

The increasing participation of women in the Panchayati Raj system over the past few years has been the most encouraging trend. At the village council level, there are numerous elected female representatives. In addition, women are involved in issues related to gender parity, education, health, and childrearing in human development. Political theorists and reformers place a high value on women's empowerment, and many of them have contributed to the creation and promotion of a variety of cottage industries.

Conclusion

Without conclusion, the research cannot be completed. Increasing a woman's or a group of women's spiritual, political, social, educational, gender, or economic power is known as women empowerment. In India, a wide range of factors, such as age, social standing (caste and class), educational attainment, and geographic location (urban versus rural), significantly influence women's empowerment. Policies pertaining to women's empowerment are in place at the federal, state, and local (Panchayat) levels in a variety of areas, including as economic opportunity, health, education, and political engagement as well as gender-based violence. One of the most pressing issues of the twenty-first century, both domestically and globally, is the empowerment of women.

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Teaching Pedagogy and Various Techniques to Enhance the Learning Skills

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Abstract

Self-directional teaching method and direct instructional teaching method are stimulus process of a life and development. Self-directional learning describes a process in which individual take initiate with or without the help of other in diagnosing the learning need and evaluated learning outcomes. Direct instructional teaching strategies are instructional approaches in which the teacher strict areas lesson in straight forward sequential manner. So, the study was done to compare the direct instructional teaching method with Self directional teaching method on knowledge domain among the nursing students. To assess direct instructional teaching method on knowledge domain among the nursing students. To assess self-directional teaching method on knowledge domain among the nursing students. To compare a study to assess to compare direct instructional teaching method VS Self directional teaching method on knowledge domain among the nursing students Analysis of data related to self-directional Teaching Method among the Nursing students of DR. D. Y. Patil college of nursing with their selected variables. Since all the p -values are large (greater than 0.05), none of the demographic variables was found to have significant association with knowledge domain among the nursing students. **Method** used was quantitative research approach and the design used for the study was cross sectional research design. 100 students of B.Sc. Nursing were selected by using probability simple random method technique. The data was collected by self-structured interview questionnaire. **Result** shows that Average score was 11.59 in direct instructional method and 11.45 in self-directional teaching method. Thus, it concludes that Students prefer the Direct instructional teaching method as compare to self-directional teaching method. **Conclusion** shows that at the end of the study, we conclude our Non-Experimental study, Comparative study to assess Direct instructional teaching method VS self-directional teaching method is completely based on teaching method and the knowledge domain. Students prefer the Direct instructional teaching method as compare to self-directional teaching method

Keywords- Direct Instructional Teaching Method, Self-Directional Teaching Method, Knowledge Domain, Nursing Students.

Introduction

Self-directional teaching method and direct instructional teaching method are stimulus process of a life and development. There are ways means mechanism to do the same as per the age topic requirements and objectivity. Self-directional learning describes a process in which individual take initiate with or without the help of other in diagnosing the learning need and evaluated learning outcomes. Direct instructional teaching strategies are instructional approaches in which the teacher strict areas lesson in straight forward sequential manner. The current teaching methodology in medical education is mostly direct instructional teaching method. Many studies have mentioned that direct instructional teaching method alone are ineffective in bringing up student interaction and skills. Published literature report that students are willing to accept innovative and interaction teaching methodologies. Nowadays, Students are attracted towards the easy way of learning more than direct instructional teaching method (lecture method) because of pandemic condition but it gets affected on the knowledge of students¹Self-directional teaching method and direct instructional teaching method are stimulus process of a life and development.

There are ways means mechanism to do the same as per the age topic requirements and objectivity. The effective learning pattern is self-directional teaching method without any stress and anxiety. In Direct instructional teaching method students have anxiety related to teacher will ask some questions in class. In Nursing education, most preferred is lecture method for better understanding and knowledge. According to current study in 2020, MBBS student from Vellore government college out of 88 students from nursing college the 48 students preferred the direct instructional teaching method and 40 preferred self-directional teaching method. In India, direct instructional teaching method is outdated now it is traditional method of teaching and self-directional teaching method is now preferred by the students. But it is affected on knowledge domain. (Direct instructional teaching method 40% and self-directional teaching method 60%).¹

Need of the Study

The current teaching methodology in medical education is mostly lecture. Many studies have mentioned that lectures alone are ineffective in bringing up student interaction and skills. Published literature reports that students are willing to accept innovative and interactive teaching methodologies. A study was conducted to compare the seminar vs. lectures in medical teaching and to describe perception of medical students about seminar and lecture.⁴ Lecture method is most convenient and inexpensive method of teaching any subject. It hardly requires the use of scientific apparatus, experiment, and aids materials except for the black board. Lecture method is teacher controlled and information centred approach in which teacher works as a role resource in classroom instruction. In this method, the only teacher does the talking and the student is passive listens. This creates dullness in the classrooms as the interaction between the pupil and teacher ceases to occur. Self-directed learning is a vital educational principle in higher education that has been promoted by various institutions due to its value in developing professionals to become lifelong learners. Deep learning approach leads to a real understanding of the subject, and deep and stable learning but surface approach focuses on memorizing information and results in incomplete understanding. Each approach has been formed of two elements: a motivation and strategy. The motive tells why the individual decides to learn; while the strategy is about how to improve the learning process in the field of education, lecture method is used very frequently. This method is used in order to acquire knowledge and concept. Lecture method mainly focuses on a cognitive objective. The main emphasis of this strategy is the presentation of the content. In this method teachers plans and controls the whole teaching – learning process. To make the lecture interesting, the teacher can take the help of audio -visual aids.⁵

Aim of the Study: Aim of the study was to assess and compare direct instructional teaching method vs Self directional teaching method on knowledge domain among the nursing students.

Research methodology

The research method adopted for approach was Quantitative Research Approach. Research design is a plan of how, when and where data are to be collected and analysed. 14 In the present study, the investigation selected cross sectional research design. Setting refers to the area where the study is conducted. 15 In the study the research setting was Dr. D.Y. Patil

College Of Nursing, Pimpri, Pune. A population refers to a total category of person or object and measurements having observable characteristics in common. 16 In this study, population is Nursing students. Sample refers to the representative unit of population under study. 17 In this study sample are 2 nd year BSC nursing students and 4th year BSC nursing from Dr. D.Y. Patil College of Nursing. Sampling is the process of selecting representative unit of the population under study. 18 Simple Random Method Technique.

Result

Analysis of data related to the direct instructional teaching method on knowledge domain among the nursing students.

Table 1: Data related to the direct instructional teaching method on knowledge domain among the nursing students.

(2nd year B.Sc. Nursing)

N=50

Knowledge Domain	Direct instructional Teaching method	
	Frequency	Percentage
Strongly agree	27	54%
Agree	21	42%
Neutral	1	2%
Strongly Disagree	0	0%
Disagree	1	2%

In Direct Instructional Teaching method 54% Students were Strongly agree, 42% were Agree, 2% were Neutral, 0% Strongly Disagree and 2% students were Disagree.

Analysis of data related to the direct instructional teaching method on knowledge domain among the nursing students.

(2nd year Bsc Nursing)

N=50

Data related to Direct Instructional Teaching Method among Nursing Students.

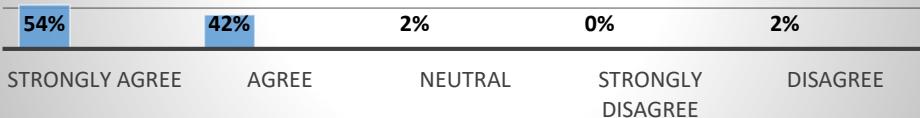


Fig-1: Data related to Direct Instructional Teaching Method among Nursing Students

In Direct Instructional Teaching method 54% Students were Strongly agree, 42% were Agree, 2% were Neutral, 0% Strongly Disagree and 2% students were Disagree. (Fig-1)

Analysis of data related to the self-directional teaching method on knowledge domain among the nursing students.

Table 2: Data related to the self-directional teaching method on knowledge domain among the nursing students.

(4th year Bsc Nursing)

N=50

Knowledge Domain	Self-directional teaching method	
	Frequency	Percentage
Strongly agree	24	48%
Agree	24	48%
Neutral	2	4%
Strongly Disagree	0	0%
Disagree	0	0%

In Self Directional Teaching method 48% Students were Strongly agree, 48% were Agree, 4% were Neutral, 0 %Strongly Disagree and 0% students were Disagree.

Analysis of data related to the self-directional teaching method on knowledge domain among the nursing students. (4th year B.Sc. Nursing)

N=50

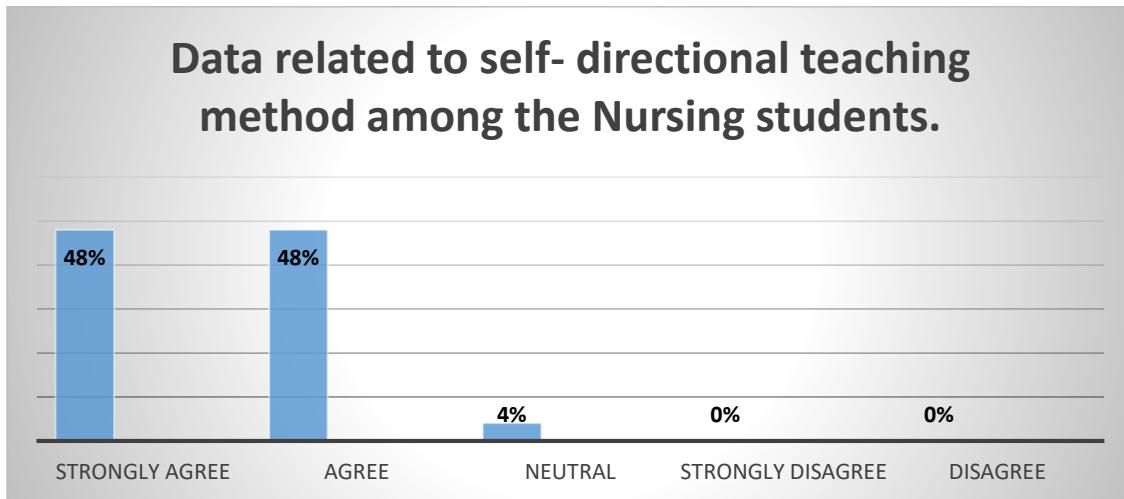


Fig- 2: Data related to self- directional teaching method among the Nursing students

In Self Directional Teaching method 48% Students were Strongly agree, 48% were Agree, 4% were Neutral, 0 %Strongly Disagree and 0% students were Disagree.

Among both the teaching methods none of the demographic variables was found to have significant association with knowledge domain among the nursing students.

Discussion

Arne Peine et al., was conducted a study on Self-directed learning can outperform direct instruction in the course of a modern German medical curriculum. The goal was to compare traditional teaching approaches to new instruction forms in terms of learning effect and student satisfaction. This chapter deals with a summary as well as it's implication for Comparative study to assess Direct instructional teaching method versus self-directional teaching method on knowledge domain among the nursing students. Pre- and post-test multiple-choice questionnaires were used to collect data. The results show that out of a total of 244 original participants, 223 completed the module and were included in the study. The groups had approximately similar scores in the pre-test. When compared to the pre-test results, all pupils exhibited significant gains. Participants in the non-self-instructed learning groups received 14.71 (seminar) and 14.37 (lecture) scores, whereas self-instructed learners received 17.23 (e-learning) and 15.81 (lecture) ratings (self-study). The self-assessment of all groups increased significantly (p.001) in the post-test, lead by the e-learning group, whose self-assessment improved by 2.36. Students in modern study curricula learn better using modern self-instructed ways than through traditional ones, according to the study. As it's known fact, the direct instructional teaching method is most effective other than self -directional teaching method related to knowledge domain among the nursing students. The range of the age of the student is 19-25 years result revealed.

Similarly, in this study on Comparative study to assess Direct instructional teaching method VS self-directional teaching method on knowledge domain among the nursing students of DR. D. Y. Patil College of Nursing out of 100 students from 2nd year and 4th year BSC nursing 46% were male and 56% were female. Maximum falls in 21-22 with 54% female in the study and 77% are localite can make direct instructed method effective as for self-direction self-perception more in concern.

Conclusion

It is concluded that Non-Experimental study, Comparative study to assess Direct instructional teaching method VS self-directional teaching method is completely based on teaching method and

the knowledge domain. Students prefer the Direct instructional teaching method as compare to self-directional teaching method. The main aim of the study was a Comparative study to assess Direct instructional teaching method VS self-directional teaching method on knowledge domain among the nursing students of DR. D. Y. Patil College of Nursing. While Comparative study to assess Direct instructional teaching method VS self-directional teaching method on knowledge domain among the nursing students of DR. D. Y. Patil College of Nursing was done, tools / questionnaire were given. It was based on variables like Age, Gender, Educational Status, Location determined the range and the domain of the study. Conclusive evidence was inferred upon after reviewing the responses of students regarding to the content of study delivered, checklist.

Acknowledgment

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Challenges in Right to Education

Shri Niharika Devi

Abstract

In 2002, through the 86th Amendment Act, Article 21(A) was incorporated. It made the right to primary education part of the right to freedom, stating that the State would provide free and compulsory education to children from six to fourteen years of age. Six years after an amendment was made in the Indian Constitution, the union cabinet cleared the Right to Education Bill in 2008. The Right of Children to Free and Compulsory Education Act or Right to Education Act (RTE), which was passed by the Indian parliament on 4 August 2009, describes the modalities of the provision of free and compulsory education for children between 6 and 14 in India under Article 21A of the Indian Constitution. India became one of 135 countries to make education a fundamental right of every child when the act came into force on 1 April 2010. The bill was approved by the cabinet on 2 July 2009. Rajya Sabha passed the bill on 20 July 2009 and the Lok Sabha on 4 August 2009. It received Presidential assent and was notified as law on 3 Sept 2009 as The Children's Right to Free and Compulsory Education Act. The law came into effect in the whole of India except the state of Jammu and Kashmir from 1 April 2010, the first time in the history of India a law was brought into force by a speech by the Prime Minister. In his speech, Manmohan Singh, Prime Minister of India stated that, "We are committed to ensuring that all children, irrespective of gender and social category, have access to education. An education that enables them to acquire the skills, knowledge, values and attitudes necessary to become responsible and active citizens of India." People are not aware even about their fundamental rights. Youth is the future of the Nation and their empowerment through RTE. In ancient times youth was not compelled to study but at present times he has to study to deal with the present world as illiterate person may be deceived or may not know his right and duties towards society and family.

Key words: Amendment Act, Indian Constitution, free, compulsory education, fundamental, gender, empowerment, RTE, society, family.

1. Introduction:

"Why does not the nation move? First educate the nation. Even for social reforms, the first duty is to educate the people." --- SWAMI VIVEKANANDA.

Education is the most crucial investment for developing and economically prosperous society. Education is an instrument for ensuring social justice and equity. The Right to Education Act, which came into force on 1st April, 2010 after 62 years of independence, has made free and compulsory education a fundamental right of every child in the 6 to 14 age group. Now India has joined the group of those countries who provide for a constitutional guarantee to free and compulsory education. The enforcement of this Right has made it a joint responsibility of Central and State Governments to provide free and compulsory education to all children by all means.

The Right to Education Act 2009, also known as the RTE Act 2009, was enacted by the Parliament of India on 4 August 2009. It describes modalities of the importance of free and compulsory education for children aged between 6-14 years in India under Article 21 (A) of the Constitution of India. This act came into effect on 1 April 2010 and made India one of the 135 countries to have made education a fundamental right for every child. It prescribes minimum norms for elementary schools, prohibits unrecognised schools from practice and advocates against donation fees and interviews of children at the time of admission. The Right to Education Act

keeps a check on all neighbourhoods through regular surveys and identifies children who are eligible for receiving an education but do not have the means to Educational challenges have been prevalent at both the centre and states for many years in India. The Right to Education Act 2009 maps out roles and responsibilities for the centre, state and all local bodies to rectify gaps in their education system in order to enhance the quality of education in the country.

2. Defining Right to Education:

The Right to Education can be defined as a fundamental right which can be claimed by a citizen and the government can be held accountable if access to education is denied. The Right to Education means that all those who do not have access to education have been violated and discriminated against. The Right to Education means that governments and international communities can be held accountable for not providing access to education.

According to the Amman Affirmation, 1996, the Right to Education is the right to participate in the life of the modern world through access to education. For education to be a meaningful right it must be available, accessible, acceptable and adaptable. The concept of these 4A's was developed by the former United Nations Special Reporters on the Right to Education, Katarina Tomasevski, and it is one of the best ways to assess education as a right and act whenever and wherever violations take place. By Availability it is meant that education is free and government-funded and that there is adequate infrastructure and trained teachers able to support education delivery. By Accessibility it is meant that the system is non-discriminatory and accessible to all and that positive steps are taken by the government to include the most marginalized. By Acceptability it is meant that the content of education is relevant, non-discriminatory and culturally appropriate, and of quality, that the school itself is safe and teachers are professional. By Adaptability it is meant that education can evolve with the changing needs of society and contribute to challenging inequalities, such as gender discrimination, caste discrimination and that it can be adapted locally to suit specific contexts. (Tomasevski, 2001)

3. Review of literature

1. **M.P. Jain (2010)**, has explained the various aspect of the various aspect of constitution. The constitutional has also led to increase textual comments. The various examples given here i.e., one of them is The Introduction of Article 21A as a fundamental Right needed a new chapter on education. Consequently, volume of the book has been increased Article 21 creatively improve quality of life of people. The court has implied a bundle of rights for people from article 21 such as RTE, right to privacy, right to clean environment etc.
2. **Dr. Surjit Singh Paur (2012)** has analyzed that education is powerful tool that give shape to individual as well as nation. The 86th constitutional amendment 2002, by parliament. Right to education inserted in fundamental right under article 21A. Right to education is free & compulsory education to all children up to age of 6-14 years. In our Act are framed properly but not implemented with true spirit. Numerous issues & challenges which need to explore & discuss for the successful implementation of right to education Act.
3. **Mona Kaushal (2012)**, has stated that in the modern era technological development, education plays vital role for overall growth of human beings. Government of India took initiative steps through enacting 86th constitutional Amendment Act 2002. The objective is free and compulsory education to children between the age of 6-14 years as a fundamental right. The article analyzes the initiatives of right to education in India with the compliance of 86th constitutional Amendment Act 2002. There is needed to prove

right to education in general grassroots level.

4. **Ashutosh Bairagi, Ashish Srivastava (2013)** have laid down that evaluation of all existing policies, schemes & judicial decisions relating to right to education. There is a question on nature & scope of RTE. There is no proper implementation of right to education. This paper attempts to analyze the different threads of a rights-based model of school education, it Certainly, does not provide an exhaustive right frame work.
5. **Dr.S. K. Kapoor (2014)** has given that human rights are the rights which are possessed by every human being irrespective of his/her nationality, race, religion etc. simple because he or she is human being. In this book chapter 67i.e. National protection of human rights -protection of human rights under Indian constitution. Economic social and cultural rights - Universal Declaration of Human Rights (UDHR) and Indian constitution there correlation of the Articles are properly mentioned here UDHR- Article 26(i) stated that right to education and free education in the elementary and fundamental stage. In the Indian constitution Article 41 and Article 45 has mentioned provisions for right to education bellow the age of six year. The above-mentioned Articles most of the c social and cultural rights proclaimed inUDHR have been incorporated in part IV of the Indian constitution.

4. Objectives of the study

- To study the historical development of Right to Education in India.
- To critically analyse the provisions under the Right of Children to free and Compulsory Education Act 2009.
- To study the basic features of RTE Act.
- To study the responsibilities of Central, State & Local authorities about the implementation of RTE Act.
- To Understand Impact of Implementation of Right to Education
- To suggest the effective ways of implementing the provisions under the Act

5. Significance of the study:

Right to Education is a new right included in our fundamental rights, given by the Indian constitution 86th amendment & 21(A) Article. Already various researches have been conducted on the previously provided six Fundamental rights, but there were very less researches conducted on Right to education act 2009 to their gender and their residential area. The research is very significant, because in our country the people are not aware about education as a fundamental right which can be evident by few of the researches given above. Due to this the childhood of India does not get opportunity to get education and is engaged in many inhuman practices.

6. Features of the study

6.1. Compulsory and free education for all

It is obligatory for the Government to provide free and compulsory elementary education to each and every child, in a neighbourhood school within 1 km, up to class 8 in India. No child is liable to pay fees or any other charges that may prevent him or her from pursuing and completing elementary education. Free education also includes the provisions of textbooks, uniforms,

stationery items and special educational material for children with disabilities in order to reduce the burden of school expenses.

6.2. The benchmark mandate

The Right to Education Act lays down norms and standards relating to Pupil-Teacher-Ratios (number of children per teacher), classrooms, separate toilets for girls and boys, drinking water facility, number of school-working days, working hours of teachers, etc. Each and every elementary school (Primary school + Middle School) in India has to comply with this set of norms to maintain a minimum standard set by the Right to Education Act.

6.3. Special provisions for special cases

The Right to Education Act mandates that an out of school child should be admitted to an age-appropriate class and provided with special training to enable the child to come up to age-appropriate learning level.

6.4. Quantity and quality of teachers

The Right to Education Act provides for rational deployment of teachers by ensuring that the specified Pupil-Teacher-Ratio is maintained in every school with no urban-rural imbalance whatsoever. It also mandates appointing appropriately trained teachers i.e. teachers with the requisite entry and academic qualifications.

6.5. Zero tolerance against discrimination and harassment

The Right to Education Act 2009 prohibits all kinds of physical punishment and mental harassment, discrimination based on gender, caste, class and religion, screening procedures for admission of children capitation fee, private tuition centres, and functioning of unrecognised schools.

The Right to Education (RTE) Forum's Stocktaking Report 2014 suggested that across the country, less than 10 per cent of schools comply with all of the Right to Education Act norms and standards. While the enactment of the Right to Education Act 2009 triggered significant improvements, concerns regarding the privatisation of education remain. Educational inequalities have held a strong ground in India for many years. While the Right to Education Act offers the first step towards an inclusive education system in India, effective implementation of the same still remains to be a challenge.

6.6. Ensuring all-round development of children

The Right to Education Act 2009 provides for the development of a curriculum, which would ensure the all-around development of every child. Build a child's knowledge, human potential and talent.

6.7. Improving learning outcomes to minimise detention

Two Days International Conference on Scientific innovation

The Right to Education Act mandates that no child can be held back or expelled from school till Class 8. To improve the performances of children in schools, the Right to Education Act introduced the Continuous Comprehensive Evaluation (CCE) system in 2009 to ensure grade-appropriate learning outcomes in schools. Another reason why this system was initiated was to evaluate every aspect of the child during their time in school so that gaps could be identified and worked on well in time.

6.8. Monitoring compliance of RTE norms

School Management Committees (SMCs) play a crucial role in strengthening participatory democracy and governance in elementary education. All schools covered under the Right to Education Act 2009 are obligated to constitute a School Management Committee comprising of a headteacher, local elected representative, parents, community members etc. The committees have been empowered to monitor the functioning of schools and to prepare a school development plan

6.9. Right to Education Act is justiciable

The Right to Education Act is justiciable and is backed by a Grievance Redressal (GR) mechanism that allows people to take action against non-compliance of provisions of the Right to Education Act 2009. To ensure all schools follow this mandate, Oxfam India in collaboration with JOSH filed a complaint at the Central Information Commission (CIC) in 2011 evoking Section 4 of the Right to Information Act (RTI Act) 2005.

Section 4 of the RTI Act is a proactive disclosure section mandating all public authorities to share information with citizens about their functioning. Since schools are public authorities, compliance to Section 4 was demanded.

6.10. Creating inclusive spaces for all

The Right to Education Act 2009 mandates for all private schools to reserve 25 per cent of their seats for children belonging to socially disadvantaged and economically weaker sections. This provision of the Act is aimed at boosting social inclusion to provide for a more just and equal nation.

7. Methodology:

It is a documentary study. It is based on official documents. The conclusion made in the study was based on Primary and Secondary sources. The Secondary sources were different books and Journal published by different writers and scholars. The Primary sources are Government Report and Books.

8. Historical Perspective of RTE-2009 Act.:

Article 21A of the Constitution (Eighty - Sixth Amendment) Act, 2002.

December 2002

86th Amendment Act (2002) via Article 21A (Part III) seeks to make free and compulsory education a Fundamental Right for all children in the age group 6-14 years.

October 2003

A first draft of the legislation envisaged in the above Article, viz., Free and Compulsory Education for Children Bill, 2003, was prepared and posted on this website in October, 2003, inviting comments and suggestions from the public at large.

2004

Subsequently, taking into account the suggestions received on this draft, a revised draft of the Bill entitled Free and Compulsory Education Bill, 2004

June 2005

The CABE (Central Advisory Board of Education) committee drafted the 'Right to Education' Bill and submitted to the Ministry of HRD. MHRD sent it to NAC where Mrs. Sonia Gandhi is the Chairperson. NAC sent the Bill to PM for his observation.

14th July 2006

The finance committee and planning commission rejected the Bill citing the lack of funds and a Model bill was sent to states for making the necessary arrangements. (Post-86th amendment, States had already cited lack of funds at State level

2009

Right of Children to Free and Compulsory Education Bill, 2008, passed in both Houses of Parliament in 2009. The law received President's assent in August 2009.

1 April 2010

Articles 21-A, the RTE Act come into effect.

9. Duties of Appropriate Government and Local Authority to implements RTE-act.

The RTE Act defines appropriate government as -

- ✓ The Central government, for schools owned or controlled by the Central government or a Union Territory (UT) Administration without legislature; and
- ✓ The State and UT government with legislature, for schools established in the territory of that State/UT.

The appropriate govt. or the local authority (meaning a municipal corporation or municipal council or equivalent body in urban areas or a Panchayati Raj Institution – PRI – in rural areas) has to provide-

- A school within 1 km walking distance for children in classes I to V and
- Within 3 kms for those in classes VI to VIII.
- In densely populated areas, depending on the number of children between the ages of 6 to 12, more than one school may be necessary.
- For remote areas, where distances are more than the prescribed kms, facility should be provided for free transportation or residence as required.
- Such a school is termed a 'neighbourhood school'.
- The location of each school has to be made known to the community it is meant to serve.
- All private schools (those that do not seek any govt. grants to impart education) in a neighbourhood are required to enrol 25% students from the weaker and disadvantaged sections of society and provide free education to them. These schools can then claim reimbursement from the govt. for the expenditure incurred, provided that, per child expenditure does not exceed the amount a govt. school spends to educate a child.

- The Central and State govt.'s have concurrent responsibility to provide funds for execution of the RTE Act.

The Central govt., apart from carrying out the mandated functions of the appropriate govt. in respect of schools owned/controlled by it, is also responsible for-

- Preparation of the National Academic Curriculum.
- Developing and enforcing standards for teachers' training, and
- Providing technical support to the State govt.'s for promoting innovations, research, planning and capacity building.

The State govt. or local authority has to-

- Prescribe curriculum and courses for study for elementary education,
- Ensure admission, attendance and completion of elementary education of the children and maintain records of children up to the age of 14 years,
- Provide infrastructure including school buildings, teaching staff and learning equipment,
- See that children from the weaker and marginalized sections of the society are not discriminated against in school,
- Provide special training facility for children not admitted to any school or those who have not completed elementary education,
- Provide training to teachers and ensure each school follows the academic calendar,
- Ensure good quality elementary education according the specified standards and norms.
- It is the duty of every parent to admit their children or ward to school and ensure that they receive elementary education.
- The appropriate govt. has to make necessary arrangements to provide one year of free pre-school training for children.

10. A critical review of the Issues & Challenges by highlighting the provision of Act-2009

“The aim of education is not the acquisition of information, although important, or acquisition of technical skills, though essential in modern society, but the development of that bent of mind, that attitude of reason, that spirit of democracy which will make us responsible citizens”- **Dr. Sarvapalli Radhakrishnan**

On the general concept of the Act-2009, the issues and challenges are very wide enough to analyse the matter which are laid in the provision of this Act. Here are some of the major issues are to be dealt. These are, Viz-

- **Why Government took many years to pass RTE?**

From RTE movement started in 1988 to Supreme Court judgment in 1993, out politicians took twenty one long years to give education as a fundamental right to the children of India. Even though nearly all educationally developed countries attained their current educational status by legislating free and compulsory education – Britain did so in 1870.

India has dithered and lagged behind in introducing such legislation, with grave consequences. Of the nearly 200 million children in the 6 to 14 age group, more than half do not complete eight years of elementary education, as never enrolled or dropouts. Of those who do complete eight years of schooling, the achievement levels of a large percentage, in language and mathematics, is unacceptably low. It is no wonder that a majority

of the excluded and non-achievers come from the most deprived sections of society – dalits, OBCs, adivasis, girls, Muslims and poor – precisely the people who are supposed to be empowered through education. Thus, it has taken 55 years from Independence to make education a fundamental right of children and a further 6 years for the Right to Education Bill to be introduced in Parliament.

- **Does RTE follow UN's Child Rights Convention?**

“The Bill needs to bring into its ambit all children in the age group of 3-16 years. It ignores children who are below 6 yrs. of age”. With heightened political consciousness amongst the deprived and marginalized, never in the history of India has the demand for inclusive education been as fervent as today. Yet even a cursory examination of the proposed Act shows some glaring shortcomings. Like the age of the child. As a signatory to the UN Child Rights Convention, India has accepted the international definition of a child, which is up to age 18. The Act proposes to cover only children from age 6 to 14, clearly excluding and violating the rights of the 0-6 and 14 to 18 year olds. This problem can be traced to the 86th Amendment Act¹⁸ and its article 21A, which defines the age from 6 to 14. As a Act flowing out of the amendment, it is clear that the Act cannot go beyond Article 21A, which makes it imperative that the 86th Amendment must be re- amended to correct this anomaly, and once that happens, the change needs to be reflected in the corresponding act at that point of time. Many argue that the Act should be put on hold till such a re-amendment is passed, but that would be playing into hands of elements who neither want the amendment nor the Act. Such elements do not want the state to invest in education and instead prefer to leave it to the markets, and persuading the Parliament to re-amend at this stage with the kind of majority required seems remote, given the fractured polity post the nuclear deal and the Mumbai terrorism episodes.

Having made education a fundamental right, the question that needs serious debate is whether the bill introduced in Parliament will help improve the situation in a substantial manner or not. To address that question, it needs to be recognized that the challenge of elementary education is to somehow find a way to deal with the elusive triangle of access, equity and quality. The Act needs to be critically evaluated from the viewpoint of this triangular challenge.

- **Elementary education—What?**

Here the contradiction lies between the two sections of the said Act, Section- 2(f) & Section

11. By describing the word elementary education of a child means the education from first class to eight classes; [under sec- 2(f)]²⁰.

Section 11 of the RTE Act, 2009 makes provision for being engaged with pre-school education. It states: “With a view to prepare children above the age of three years for elementary education and to provide early childhood care and education for all children until they complete the age of six years, the appropriate Government may make necessary arrangement for providing free pre-school education for such children”. In a case, Shikshan prasarak Mandal, the Bombay High Court Give a decision that within the radius of 5 km there is no school. By this the existence of the school was very strong for the vouch of the elementary education of the children.

- **Is education really free under RTE?**

The basic aspect of access is the provision of a school in the proximity of a child, since there are still areas in the country where such access is lacking. The Act envisages that each child must have access to a neighborhood school within three years from the time the Act is notified as an act. The presence of a nearby school is, however, no guarantee that a child can indeed access it. One of the key barriers, particularly for the poor and the deprived, is the issue of cost. That is where one of the critical aspects of Article 21A comes into play, namely, the state shall provide 'free' education. Normally, 'free' is interpreted as non-payment of fees by the parents of the child. But numerous studies have concluded that the fee constitutes only one of the components of educational expenditure. And since the landless, poor and socially deprived cannot meet the other expenses, this result in the non-participation of their children in education.

These other expenses differ from place to place, though uniforms, copies and books and so on are perhaps common. The Act defines free education to mean any fee, expense or expenditure that keeps a child from participating in education, and obliges the state to provide all these. This broader definition, with implications for higher expenditure by the state, appears to be a better way to meet the challenge of access in terms of costs, rather than providing a list of items that will be covered, which are difficult to anticipate in different locations and in the future and hence cannot be exhaustive.

- **Is quality education available to all under RTE?**

Sustained participation in schooling is, however, equally influenced by the quality of access. The high non retention rates in spite of higher enrolments in recent years are a clear indication that concerns of quality cannot be postponed till access is guaranteed, as also by the increasing tendency to seek out questionable private schools perceiving their quality to be 'better'. The approach of providing schooling through education guarantee centers and untrained para teachers has also greatly exacerbated the problem of quality of government schools ever since the District Primary Education Programme pioneered this cost-cutting strategy, further expanded through the Sarva Shiksha Abhiyan (SSA) in many states of the country. This approach has resulted in making education more iniquitous, since the government system itself now has a variety of streams – the EGS Centre, the rundown rural or *Basti* school, the alternative school, the Kendriya, Sarvodaya, Navodaya and other kinds of schools and so on²².

Clearly, access to each is determined according to the social and class background of children, thus segregating them further. Consequently, the social integration that education was expected to assist, by bringing children from diverse backgrounds together in the same classrooms, has been allowed instead, one may say deliberately, to experience higher degrees of fragmentation. No wonder then that an increasing number of parents, both urban and rural, despite great financial difficulties, are attracted to the option of purchasing education from private profit-making schools that seem to have external frills of quality and regular presence of teachers.

While ensuring that every child who traverses through the elementary education system acquires a certificate of completion, the Act fails to guarantee that a child has acquired

competencies deriving from said education process. No standards are set for learning outcomes. A case of guaranteeing graduation but not education.

Failure of the child to attest to acquisition of competencies is also not flagged for remedial action and systemic enhancements. The Act should also define a framework to measure the quality of education imparted, without creative and regular assessments, quality of education cannot be guaranteed.

- **Reservation @ 25% in private Schools- Why?**

Regarding equality, **Dr. Ambedkar** stated in the Constituent Assembly “ We must begin by acknowledging the fact that there is complete absence of two things in Indian Society. One of these is equality.

On the social plane, we have in India a society based on the principle of graded inequality which means elevation for some and degradation for others. On the economic plane, we have a society in which there are some who have immense wealth as against many who live in abject poverty.”

The proponents of the Act, especially the internationally funded NGOs, make much out of the provision of 25% reservation in the private schools for the disadvantaged children. Closer examination reveals a different story. As per the Seventh Educational Survey, about four crore children out of 19 crore in the 6-14 age group are currently studying in private schools at the elementary stage (class I-VIII). The above provision will create space for one crore for which the private schools will be reimbursed for the tuition fees. Assuming that these schools are providing quality education, the provision helps only a minority of the underprivileged. What is then the Act vision of quality education for the remaining 15 crores? They will continue to receive education through a multi-layered school system with each social segment in a separate layer, the much-acclaimed norms and standards in the Bill’s Schedule notwithstanding.

Back to the 25% provision, everybody knows that, apart from the tuition fees, the private school child has to shell out money for a range of items throughout the year expensive uniform and shoes, extra textbooks, picnic and extra-curricular charges, computer fees etc. Who will pay for that? Why has the Act not thought of changing the elitist character of these schools that violate the educational principles enunciated by Phule, Tagore and Gandhi? Clearly, the Act lacks the vision of what constitutes quality in relation to India’s needs. That, however, is another debate.

- **Availability of Teachers and Required Pupil-Teacher Ratio:**

Five lacs new teachers are to be recruited and 5 lacs new classrooms are to be constructed to meet the required 30 : 1 pupil teacher ratio. There are seven lacs teachers in the recognized 13 lacs primary schools. Out of these, three lacs teachers are either untrained or under-training. In many states large numbers of teachers are para-teachers and many of them are untrained. As per a recent report by NUEPA,

Bihar tops amongst the states having poor pupil-teacher ratio and Uttar Pradesh comes at second place. In about 35 percent primary schools in Uttar Pradesh, pupil teacher ratio is 60:1. Fifty one percent primary schools in Uttar Pradesh are having three or less number of teachers. Out of these, 38 percent are para-teachers. In the present circumstances, to maintain pupil-teacher ratios as per the Act, appears a distant dream.

- **Who will implement and monitor the child rights?**

The Act is silent on the aspect of actual competence of and quality of monitoring by the national and state commissions for protection of child rights. While the provisions provide that an aggrieved person may lodge a complaint with the local authority, there is an obvious problem in this clause, since the very same body that is responsible for ensuring protection of the rights of the child is also made responsible for deciding upon a complaint against it. The Act is silent on the state parties that will be held responsible if its implementation is found lackadaisical.

Can there be a Fundamental Right to unequal and inferior education? The central government's audible answer: Yes, indeed! Professor Amartya Sen told the Confederation of Indian Industries in December 2007 that school education can be funded only by the state. No advanced country in the world has ever been able to provide universal quality education by negating or undervaluing its public-funded education system. This is true for all the G-8 countries, including the USA. Defying this universal experience, the Right to Education Act is daring to undo the history.

11. Suggestions: The Right of Children to free and Compulsory Education Act, 2009 is a landmark development in area of providing the basic human right to the children. The children in absence of ample opportunity become victim of social evils.

Child labour is so rampant in the country. If children are engaged in studies at the tender age there will be proper development of their personality. Therefore, it is essential to effectively implement the Act. Following are the suggestions for the effective implementation of the Act-2009,

- The privatization of education should be regulated. The private schools should strictly instruct to reserve 25 % seats for the weaker and disadvantaged group of students.
- There is a need to bring more awareness amongst the parents, teachers and students regarding the Act. In absence of information amongst the people the Act cannot be implemented effectively.
- There must be more allocation of funds to the state governments for implementing the Act. The government schools in absence in sufficient funds are not able to abide by the norms laid down under the Act.
- There must be proper incentives for the parents and the students who are abiding by their fundamental duty as laid down under Article 51-A of the Constitution.
- There must be ban on the private tuitions and referrals. Although the RTE Act provides that the teachers should not engage themselves in the private tuitions, there must also be prohibition on teachers referring students for private tuitions.
- More scholarships must be introduced to encourage the students belonging to the weaker section of the society to pursue their studies.

- There must be proper monitoring agencies to monitor the effective implementation of the Act.
- The Act also lacks effective auditing. An Auditing mechanism like that of MANREGA is required to monitor the status of implementation of the Act.

Conclusion: For the effective implementation of the RTE Act the courts in India have also shown a very activist approach. The Supreme Court decisions in Mohini Jain Case and Unnikrishnan Case have given the momentum to enforce this Constitutional Right of education for all the children. With the enactment of the RTE Act India has moved forward to a right- based framework that casts a legal obligation on the Centre and the state to implement this fundamental right guaranteed under Article 21-A of the Constitutions. The Act is also aligned to the international norms on the right to education. The Act ensures the education rights which are available, accessible, acceptable and adaptable to all. In order to meet the challenges and surmount the hurdles that come in the way of the implementation of the Act it is needed to concentrate all efforts with full dedication and commitment.

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Spiritual Intelligence and Cancer Patients

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ABSTRACT

The main aim of the study is to status of Cancer and its associated problems in India and relationship between Spiritual intelligence and coping strategies of cancer patients receiving palliative care and study coping strategies of cancer patients receiving palliative care and study Spiritual intelligence of cancer patients receiving palliative care

It is concluded that the Spirituality represents a unique and desirable attribute of human beings which adds meaningfulness and liveliness to the physical, emotional, cognitive and social facets of human life. It has been found equally relevant to understand and unearth the intrapersonal, interpersonal, social community and group relationships and their dynamics. Spirituality is the aspect of humanity that refers to the way individuals seek and express meaning and purpose and the way they experience their connectedness to the moment to self, to others, to nature and to the significant or sacred. The spiritual dimension acts in harmony with the universe and strives for answers about the infinite, and comes into the fore as the person faces emotional stress, physical illness, or death. Spirituality displays its close links with emotional well-being and it is about seeking a meaningful connection with something bigger than yourself that can result in positive emotions, such as peace, contentment, gratitude and acceptance.

Keywords: spiritual, intelligence, coping strategies, cancer patients

INTRODUCTION

Cancer, a complex and multifaceted disease, has a profound impact on individuals, families, and societies worldwide. Its diagnosis and treatment often evoke a wide range of emotional, psychological, and spiritual challenges for patients. In recent years, there has been a growing recognition of the importance of addressing not only the physical aspects of cancer but also the emotional and spiritual dimensions of coping with the disease.

Spiritual intelligence (SI) is a concept that has gained attention in the field of psychology and healthcare as a crucial factor in resilience, coping, and overall well-being. It encompasses a person's ability to transcend material concerns and connect with deeper existential and spiritual realities. SI involves aspects such as self-awareness, transcendence, compassion, and a sense of meaning and purpose in life, all of which can play a significant role in how individuals navigate the experience of cancer.

Understanding the role of SI in the context of cancer requires a comprehensive exploration of coping strategies employed by patients facing this life-altering illness. Coping strategies refer to the cognitive, emotional, and behavioral efforts individuals use to manage stress, uncertainty, and adversity. Cancer patients often employ a range of coping mechanisms, including problem-focused coping (e.g., seeking information, making treatment decisions) and emotion-focused coping (e.g., seeking social support, engaging in relaxation techniques).

This research paper aims to delve into the intricate interplay between spiritual intelligence and coping strategies among cancer patients. By examining the literature, empirical studies, and theoretical frameworks, this study seeks to shed light on how SI influences coping processes and outcomes in the context of cancer care.

The importance of this research lies in its potential to inform healthcare professionals, caregivers, and policymakers about the holistic needs of cancer patients. By recognizing the significance of spiritual intelligence and effective coping strategies, interventions and support systems can be tailored to address not only the physical symptoms but also the psychological, emotional, and spiritual well-being of individuals facing cancer.

The structure of this paper will involve a thorough review of relevant literature on spiritual

intelligence, coping strategies, and their intersections with cancer care. Additionally, empirical studies and case examples will be examined to provide insights into real-world applications and implications for clinical practice.

In summary, this research aims to contribute to the growing body of knowledge on the role of spiritual intelligence in the coping process of cancer patients. By bridging theoretical concepts with practical implications, this study seeks to enhance the quality of care and support provided to individuals navigating the challenging journey of cancer diagnosis, treatment, and survivorship.

Spiritual intelligence

It is not any less difficult to express and measure the sense of spiritual anguish or distress, just as it might be challenging to describe and quantify physical pain at times. There is a high probability that those who are undergoing life-threatening disease may also be experiencing spiritual intelligence. This is not an unknown phenomenon. "Spiritual intelligence" is defined by the Hospice and Palliative Nurses Association as "a disruption in one's beliefs of value system, a shaking of one's basic beliefs." This definition describes the phenomenon of spiritual intelligence. According to Anandarajah and Hight, "spiritual intelligence and spiritual crisis" occur when a person is "unable to find sources of meaning, hope, love, peace, comfort, strength, and connection in life or when conflict occurs between their beliefs and what is happening in their life." In other words, when a person is unable to find these things in their life, they are experiencing a spiritual crisis.

Identifying problems, symptoms, or attitudes that a patient may be expressing that may indicate spiritual intelligence is an essential step in the treatment process. Those who express anger at God or a higher authority, question the meaning of existence, and wonder where God is during their suffering are examples of people who may be experiencing spiritual intelligence. They may also understand that their disease is a punishment for the decisions they have made throughout their lives. The individual may also experience the sensation that they have lost their sense of direction and purpose, that they are questioning their belief systems, or that they are directly seeking spiritual assistance.

The lady It is generally agreed that Cicely Saunders, who is often regarded as the person who established the contemporary hospice, was the one who first proposed the idea of total agony. In this concept, the physical, social, emotional, and spiritual aspects of distress were all taken into consideration. Pain is generally considered to be one of the most painful symptoms that patients may encounter when they are receiving palliative care. There are situations that each of us has encountered in which the management of an individual's pain appears to be more challenging than one would predict given the circumstances. The question of whether there is something else that is contributing to the experience of bodily symptoms of distress is an important one to consider in situations like these examples. Individuals who do not address their spiritual concerns may find that their efforts to alleviate other symptoms are unsuccessful, which can have a negative impact on their quality of life. There is a possibility that uncomfortable symptoms will be alleviated if each dimension is handled in turn.

Coping strategies

A study was conducted by Balboni and colleagues to investigate the relationship between religious and spiritual support among cancer patients and their preferences for end-of-life treatment and their quality of life. Religion and spirituality were cited as variables that were of the utmost importance in assisting respondents in adjusting to their sickness by 88 percent of those who participated in this study. Additionally, the importance of prayer, meditation, and religious studies was emphasised as additional aspects that have a role in the process of coping with disease. There is a plethora of theory that seems to show that religious coping can provide both purpose and comfort to the individual.

Within the context of spirituality and religion, religious coping is a separate entity that exists within the framework. This idea refers to the manner in which patients make use of their

religious beliefs in order to comprehend and adjust to the many stressors that they face in their lives. The use of constructive reliance on faith to make sense of and find meaning in disease is an example of positive religious coping, which is frequently connected with higher psychosocial adaption to stressors. Individuals who engage in negative religious coping strategies, on the other hand, may be more inclined to regard disease as a form of divine vengeance or punishment. Despite the fact that it is less common, negative religious coping techniques should nevertheless be taken into consideration as part of a comprehensive spiritual evaluation because they may indicate an existential crisis.

Coping strategies in cancer patients

Cancer is a disease that worsens over time and has a negative impact on the mental health of those who are afflicted with it. Because their odds of leading "a normal life" are reduced, patients who have been diagnosed with cancer encounter changes in their day-to-day lives. Emotional instability is produced in humans when they are confronted with potentially dangerous circumstances, such as receiving a diagnosis of cancer. This is because the individual is vulnerable because of the changes that will take place during the course of the disease. Most of the time, this renders it impossible to cope in an acceptable manner. It was Lazarus and Folkman (1984) that came up with the concept of coping. These authors characterised coping as being "Those constantly changing cognitive and behavioural efforts developed to handle specific external and internal demands that are evaluated as exceeding or overflowing the individual's resources." "Coping is a cognitive and behavioural effort to manage, reduce, minimise, dominate or tolerate the external and internal demands that appear and generate alterations". During the past two decades, this particular field of study has emerged around the concept of coping methods. The purpose of this study is to investigate the ways in which individuals cope with stressors, such as chronic illnesses, daily stressors like a fast-paced work environment, or stressful life events like the loss of a job or a diagnosis of infertility.

In general, coping refers to the series of "thoughts and actions that enable people to handle difficult situations", "refers to coping as a stage of recurrent change through which the individual faces the demands of the sociocultural context that determine the reciprocal relationship in their way of acting internally and externally." It is also possible to say that it is described as the "cognitive and behavioural" "effort" that an individual is required to undertake to deal with these external (environmental, stressors) or internal (emotional state) demands, which are regarded as something that is beyond the resources that the individual possesses. Are the things that have been decided upon to be referred to as coping techniques. Because of the expansive nature of this concept, it is possible to consider that emotional responses, such as rage or depression, are also a component of the overall coping process that an organism engages in when confronted with a demanding environment. For instance, a patient who is experiencing feelings of depression may choose to remain in bed. It is a form of coping strategy, in the same way that a more active strategy can be (e.g., going to the doctor); although the nature of these techniques is not always aware, empirical study has focused on those that individuals can consciously recognise". "Both a collection of cultural assumptions about how we believe individuals generally behave or should behave in the face of a specific painful experience and hypotheses supported by limited evidence or inaccurate assessments have been conceptually driving research on coping methods. This research has been conceptually driven by both factors. The study has focused on the negative reactions of sadness, hopelessness, and depression since it is expected that there will be a reaction of deep despair when confronted with a chronic illness or the death of a child, for example. As a result, the focus of the study has been on these unfavorable reactions. Recent study on coping with irreparable unpleasant events, on the other hand, suggests that these characteristic images may respond more significantly to a stereotype than to the actual events that take place. The purpose of this study was to determine the coping mechanisms utilized by a group of cancer patients who were being

treated at a national reference hospital.

BRIEF HISTORY OF CANCER EPIDEMIOLOGY

The concept that environmental influences might influence the development of illness is where the field of epidemiology got its start. This concept was prevalent in many ancient cultures from the beginning. Hippocrates, who lived around 2400 years ago, articulated this concept in a clear and concise manner: "Whoever wishes to pursue the science of medicine in an appropriate manner must proceed thus." The first thing that he should do is think about the consequences that each season of the year may have. This is because the seasons are not all the same, but they vary greatly in both their characteristics and the ways in which they change. The next topic to be discussed is the hot winds and the cold winds, particularly those that are general, but also those that are specific to each individual place. It is also necessary for him to take into account the characteristics of the waters (...) and the manner in which the indigenous people get water, whether they utilise water that is soft and marshy, or waters that are hard and originate from rocky heights, or waters that are brackish and harsh. In addition, the soil, regardless of whether it is vacant and dry, forested and irrigated, hollow and hot, or elevated and cold. The manner of life of the people is also something that they find to be appealing, regardless of whether they are big drinkers, take lunch, and are sedentary, or if they are sporty, hardworking, consume a lot of food, and drink very little. [...] In light of this information, he is required to investigate the many issues that take place. Because if a physician is well-versed in these things, preferably all of them, but at the very least most of them, he will not, upon arriving in a town with which he is not familiar, be ignorant of the local diseases, or of the nature of those that commonly prevail; with this knowledge, he will not be at a loss in the treatment of diseases, nor will he make mistakes, as is likely to be the case if he does not have this knowledge before he considers his various issues.

Hippocrates thought that cancer was a sickness caused by an excess of "black bile," which was produced by both the spleen and the stomach, but not by the liver. This belief remained prevalent even though Hippocrates placed a strong focus on the role that environmental influences played in the development of human illness. However, it wasn't until the Renaissance that his theories started to be contested by a number of doctors. During the Middle Ages, his ideas were the most widely used in the field of medicine. These individuals included Ramazzini. In his work titled "De Morbis Artificum" (1713), which Wright translated into English in 1964, he saw that the high incidence of breast cancer among nuns was related to the fact that they followed a celibate lifestyle. This finding has survived the test of time. A study written by Rigoni-Stern and published in 1842 (which was later translated into English by De Stavola in 2987) provided confirmation of this discovery. Within the pages of his Chirurgical Observations, which was published in 1775, Percival Pott detailed the connection between soot and the development of scrotal cancer among chimney sweeps. In the field of epidemiology, his work is today regarded as a crucial milestone. Pott was the first person to find a connection between this illness and occupational exposure, which opened the door to the potential of prevention.

They are forced to climb chimneys that are narrow and sometimes hot, where they are buried, burned, and almost suffocated; and when they reach puberty, they become susceptible to a disease that is extremely loud, painful, and fatal. "The fate of these people appears to be particularly difficult; in their early infancy, they are most frequently subjected to a great deal of brutality, and they are almost starved with cold and hunger."

DISCUSSION

The findings of the study evinced that spiritual beliefs, religious practices and social support significantly shaped the perceived health and quality of life of both the clinical and non-clinical male and female participants. The male participants of clinical and non-clinical groups achieved significantly higher mean scores of spiritual beliefs, perceived health and quality of life as compared to their female counterparts. Conversely, the females of both clinical and non-

clinical categories evinced higher mean scores on religious practices and social support as compared their male counterparts. The significant positive correlations were observed among the scores of spirituals, religious practices and social support, and the scores of perceived health and quality of life of the male and female participants of both the categories. Spiritual beliefs and religious practices and social support contributed significantly to the perceived health and quality of life of the participants suffering from cancer and normal healthy participants. In essence, the results showed that the male cancer participants of clinical and nonclinical categories achieved higher mean score on spiritual beliefs as compared to their female counterparts.

Contrarily, the cancer and normal health female participants achieved significantly higher mean score on the measure of religious practices as compared to the respective categories of the male participants. The female cancer and normal healthy participants achieved higher mean scores on the measure of social support as compared to the male participants of their respective categories. On the measure of perceived health, the male cancer and normal healthy participants achieved higher mean score as compared to the female participants of respective groups.

The result evinced that the male participants of clinical and non-clinical categories evoked higher mean scores on the measure of quality of life as to the female participants of their respective categories. The results showed that the clinical participants achieved higher mean scores on spiritual beliefs, religious practices and social support as compared to their non-clinical counterparts. The non-clinical participants scored higher mean scores on the measures of perceived health and quality of life as compared to the clinical. The non-clinical participants showed higher mean scores on the measures of quality of life as compared to the cancer patients.

The results indicated that there were significant correlations among the scores of the spiritual belief and perceived health, the scores of spiritual beliefs and quality of life, and the scores of religious practices and perceived health of the male and female participants suffering from cancer. The results exhibited that there were positive non-significant correlations between these scores for male and significant positive correlations between these scores for female participants with normal health. The results exhibited that there was a positive significant correlation between the scores of social support and perceived health of the male and female participants.

The results demonstrated that the scores of spiritual beliefs accounted for significant variance in of the scores of perceived health and quality of life of the male, female and all the participants with cancer, respectively. The scores of religious practices contributed significantly to the scores of perceived health of the female and all the participants with cancer. The results further exhibited that the scores of religious practices and social support contributed significantly to the scores of quality of life of the male, female and all the participants with the cancer. The results exhibited that the scores of spiritual beliefs contributed significantly to the scores of perceived health of the female and all the participants with normal health. The results exhibited that the scores of spiritual beliefs contributed significantly to the scores of quality of life of all the participants with normal health. The results also exhibited that the scores of religious practices contributed significantly to the scores of perceived health and quality of life of the male and all the participants with normal health.

CONCLUSIONS

Spirituality represents a unique and desirable attribute of human beings which adds meaningfulness and liveliness to the physical, emotional, cognitive and social facets of human life. It has been found equally relevant to understand and unearth the intrapersonal, interpersonal, social community and group relationships and their dynamics. Spirituality is the aspect of humanity that refers to the way individuals seek and express meaning and purpose and the way they experience their connectedness to the moment to self, to others, to nature and to the significant or sacred. The spiritual dimension acts in harmony with the universe and

strives for answers about the infinite, and comes into the fore as the person faces emotional stress, physical illness, or death.

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How Covid has Impacted Agriculture in India

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ABSTRACT

The COVID-19 crisis has posed significant challenges, particularly in developing countries. Agriculture is critical to economic development in developing economies. Agriculture cannot be avoided in order to ensure national food and nutritional security. Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka make up approximately 25% of the world's population. Agriculture provides a living for more than 70% of the people in India. Agriculture employs approximately 60 percent of the total labour force and contributes 22 percent of regional GDP. According to various reports, prior to the pandemic, approximately 649 million people were moderately or severely food insecure, with 271 million severely food insecure. Researchers are concerned that COVID-19 will worsen the food insecurity situation. The impact of COVID 91 was investigated in lieu of agricultural exports in this study. It is surprising to report that during the fiscal year 2020-21, India's exports to other countries increased due to favourable weather and the Monsoon. During the April-February fiscal year 2021, India's agricultural exports increased by nearly 18%. (FY21). Given the negative impact of the COVID-19 pandemic on several sectors of the Indian economy, the growth is unusual. It shows that pandemic-induced curbs and lockdowns had no negative impact on agricultural product production and export.

Keywords: economic development, COVID-19 pandemic, food insecurity, India's agriculture exports.

INTRODUCTION

COVID-19, which originated in Wuhan, China – the epicentre – eventually spread throughout the world and became a pandemic. India has already become a hotspot for the virus, infecting 9.6 million (14.6 percent of global infection) as of December 6th, 2020, resulting in a 23.9 percent drop in GDP in quarter 1, FY 2020–21.² A pandemic shock can have a greater economic impact due to lost human lives than a weather shock such as a drought or flood, or a trade embargo. Undoubtedly, all of these shocks have an impact on agricultural systems; however, pandemic shocks have an impact on all sectors of an economy. A pandemic disrupts food demand and supply, affecting the global supply chain, whereas droughts are typically localised, affecting only the associated sector or stakeholders (Mishra et al., 2021). Similarly, trade embargo shocks affect a specific sector and can be corrected in the short term with appropriate policy measures. For example, in the event of a supply shortage due to a drought, globally connected wholesalers and retailers source from alternative sources to avoid negative consequences (Mishra et al., 2021). On the contrary, the impact of a pandemic may be far-reaching and harsher, even causing a country to enter a recession.

A close examination of the export performances of various agricultural commodities in FY21 reveals the spectacular growth of a few products that have led the overall increase in exports. Wheat, vegetable oils, other cereals, molasses, and non-basmati rice are the five products in this category. The growth rates of these five products are notable given that, with the exception of wheat and vegetable oil exports, which increased by 19% and 61%, respectively, the rest experienced negative growth rates in FY20. Because of their exceptionally strong growth in exports, these products now account for 140% of total agricultural exports in FY21.

Good monsoon and weather conditions in FY21 contributed to a bumper harvest in India, which boosted agricultural exports. Interestingly, while industrial production and services sectors were severely impacted by labour scarcity caused by the lockdown, agricultural production was unaffected because migrant labourers returned to the rural economy, significantly contributing to crop production. Unlike India, however, dry weather conditions impacted farm outputs in several of India's competitors, including Vietnam, Thailand, Argentina, and Brazil, allowing Indian agricultural exports to capture larger market shares. India did not suffer from any food shortages during its period of lockdown, avoiding the possibility of restricting food product exports while also facilitating exports at globally competitive prices. In addition, to ensure domestic food security in the midst of the pandemic, other major agricultural exporting countries implemented export restrictions. Another important factor driving India's increased agricultural exports was this. For example, India's phenomenal growth in wheat exports is linked to export curbs imposed by Russia, the world's largest wheat exporter. Domestic food security concerns have also prompted countries to stockpile, including major economies such as China. Under current conditions, countries have a greater proclivity to import and stockpile, which accounts for India's large exports to the United Arab Emirates (UAE), Malaysia, the Netherlands, and the United Kingdom (UK). The pandemic has also aided India's exports to neighbouring South Asian countries via government-to-government contracts, such as those to Afghanistan. While unrelated to COVID-19, ongoing political unrest in Myanmar has shifted grain demand in Southeast Asia towards India, as evidenced by high exports of other cereals and molasses to Vietnam, Thailand, Malaysia, and the Philippines.

REVIEW OF LITERATURE

A limited researches have been conducted on the exports of agriculture of India but some relevant findings of studies are hereby support the present research. The crisis' uncertainty, restrictions on inter-state movement, and lack of transportation disrupted food supply chains, causing food prices to spike (Kalsi et al., 2020) and affecting farm operations. An analysis of major food commodities using official time series price data from 01.11.2019 to 10.08.20209 revealed that wholesale and retail prices of pulses, wheat flour, and milk were 1–5% higher a month after the lockdown; prices of edible oils and staple cereals (rice and wheat) were 4–9% lower due to the removal of import restrictions and government interventions such as free distribution of food grains. Tomato prices increased by 77–78 percent in a week and 114–117 percent in a month following the lockdown (for more details see Cariappa et al., 2020a). Market arrivals increased in May as a result of distressed sales, and market reforms protected farmers from lower prices (Varshney et al., 2020). Smaller cities and rural areas experienced higher price increases than urban areas (Cariappa et al., 2020a; Narayanan and Saha, 2020). According to survey results, three-fourths of consumers reported a price increase in food commodities during the lockdown (Cariappa et al., 2020a). The fear is that rising prices will cause social unrest (Bellemare, 2015); however, the Indian government has handled the situation deftly, with timely market reforms and social safety nets for the poor, migrants, and farmers. Given the magnitude of the COVID-19 outbreak and the ensuing panic, food prices were quite resilient (except for vegetables). The sector's resilience may be due in part to timely short-term policy support (Varshney et al., 2020), and thus we are not yet on the verge of a price spike (Barrett, 2020)

The COVID-19-induced lockdown in India disrupted food markets, forcing consumers to change their consumption habits. Consumers prioritised what they desired and what they truly required. According to various surveys, people lost their jobs or had their income reduced during the lockdown (Arun, 2020; Cariappa et al., 2020a; Imbert, 2020; Ray, 2020). The lockdown, combined with a sudden drop in income, raised serious concerns about India's food and nutrition security. According to a survey of 2259 migrant youth, 32% reduced their daily food intake (Imbert, 2020). Consumers

altered their behaviour patterns by reducing non-essential consumption, reducing market visits, stocking, and consumption behaviour changed equally across intensity of incidence, viz., green, orange, and red (Cariappa et al., 2020a). Indian agricultural exports have benefited from favourable prices as global food prices rise in the latter months of 2020, as countries emerge from trade embargoes and lift trade restrictions. Going forward, the trend's continuation will be determined by India's internal situation as well as global demand conditions. The recent increase in COVID-19 cases in India poses significant risks in this regard. Export prospects are also dependent on whether countries maintain export restrictions and trade restrictions.

Objective of the Study

To analyse the trends of India's Agriculture Exports during the period 2019-2022.

RESEARCH METHODOLOGY

This research is descriptive in nature. Secondary sources of data have been used for this study. A number of reports from news agencies, national and international sites, web blogs, web newsletters, different agriculture research organizations' reports, articles, and journals have been used to write this paper. The period of the study started from 2019-20 to 2021-22 for the three years. In these three years the statistics of India's Agriculture Exports have been depicted and through trend analysis, the growth has been shown. The source of statistics are from DGCIS (The *Directorate General of Commercial Intelligence and Statistics*).

Statistical Analysis

To meet the objectives of the study, tabular analysis technique was applied by using, averages, percentages, coefficient of variation, standard deviation, and trend line.

RESULTS

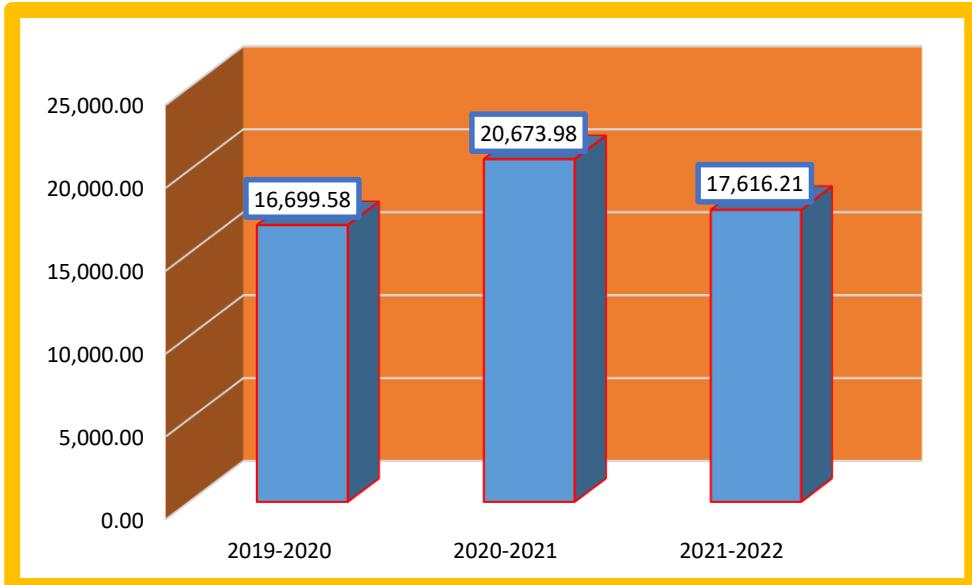
H₀₁: There will be no significant increase in India's Agriculture Exports during the period 2019-2022.

India's Agriculture Exports

FY	US\$ Million	Index
2019-2020	16,699.58	100
2020-2021	20,673.98	23.80
2021-2022	17,616.21	5.49
Total	54,989.77	
Mean	18329.92	
SD	2081.12	
Coefficient of Variation	11.35	

Significant at 0.004

India's Agriculture Exports



DGCIS (The Directorate General of Commercial Intelligence and Statistics).

The figure reflects the trend analysis of India's agriculture exports during the period of 2019-2022 for three years and found that in 2020-21, its growth rate is increased 23.80 and in 2022, it declined to 5.49 so during the period of 2020-21, the impact of COVID-19 is measured. The coefficient of variation is also positive for these studied period and significant at $0.000 < 0.004$ so the null hypothesis stated 'There will be no significant increase in India's Agriculture Exports during the period 2019-2022' is rejected and concluded that increase in India's agriculture exports was noted.

CONCLUSIONS

The pandemic-caused crisis has devastated both the Indian and global agricultural systems. A global food security crisis is potentially looming, which cannot be avoided unless the effects of COVID-19 on the agricultural system, particularly in developing countries, are understood. A number of food exporting countries, including Kazakhstan, Myanmar, Russia, and Vietnam, have imposed cereal trade restrictions such as bans, quotas, and licencing, distorting global food supply (GTA, 2020). Disruptions in supply and/or value chains result in food waste, which causes price volatility and has implications for food and nutritional security. For example, due to misinformation about the spread of COVID-19, Bangladesh experienced significant food waste in perishables such as milk and vegetables, as well as decreased consumption of non-vegetarian items such as poultry products and fish – a major source of protein (Termeer et al., 2020a). For some time, India has seen a steep reduction in consumption of poultry meat due to the same reason, causing enormous income loss to poultry farmers.

Because the COVID19 pandemic is a health crisis of unprecedented proportions, the health sector would obviously (and logically) receive the lion's share of future Budget allocations. To avoid irreversible damage to the farm economy, investments should not be crowded out of the primary sector. Manufacturing and service sectors may take a hit in the short term as the economy recovers. It will thus be very appropriate to focus attention on agriculture as a growth engine as well as to bring resilience in food (and nutrition) security. At this critical juncture, when climate change is already having a negative impact on agriculture, productive investments, including research and innovation, would be extremely beneficial.

Land leasing, contract farming, and private agricultural markets, among other structural reforms, have long been advocated to boost agricultural investment and growth. However, because state governments have not implemented these laws consistently, the sector's full potential remains unrealized. These reforms will necessitate significant political will. Concerns about a slowdown in state zeal in the post-COVID scenario could be addressed by the Federal Government through appropriate incentive mechanisms to the states.

With a growing population comes an increase in food demand in India. However, the Green Revolution's negative externalities, particularly environmental trade-offs and staple cereal fundamentalism, have since been realised. As a result, where diets are more diverse, it is preferable to switch to a suitable model with a far stronger nutrition focus. A post-COVID scenario provides a once-in-a-lifetime opportunity to repurpose existing food and agriculture policies for a healthier population.

There have been global concerns, or rather speculations, about a few global players restricting agricultural commodity exports. With a stable agri-exports policy, India, which has a trade surplus on commodities such as rice, meat, milk products, tea, honey, horticultural products, and so on, may seize the opportunities by exporting such products. In 2018-19, India's agricultural exports were valued at 38 billion US dollars, and is expected to rise further if favourable policies are implemented. Development of export-supportive infrastructure and logistics would necessitate private-sector investments and support, which would benefit farmers in the long run by increasing their income.

Many climate models predict a favourable monsoon season in 2020 (which the India Meteorological Department has since officially announced) because the El-Nino weather phenomenon, which disrupts rainfall in India, is not present. This is indeed good news in the COVID scenario, assuming agriculture can continue to operate relatively unaffected.

The good news is that the Indian government has increased its focus on nutrition (aside from food) security and increasing farmer income (rather than enhancing farm productivity). Changing consumer behaviour through appropriate programmes and incentives is already on the agenda. All of this requires a shift in the current landscape of policy incentives that favour the two major staples, wheat and rice. Post-COVID19 agricultural policies must include these imperatives for a food systems transformation in India.

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Organisational Behaviour

Ms. Monika

Abstract

Positive organizational behavior is a vast topic and has become a means for improving performance in an organization. Although there is a strong need of understanding positive organizational behavior, there has been a lack of empirical research on this topic. This study aims to fill this gap by conducting a systematic review of the existing literature on positive organizational behavior from the period of 2002 to 2022. The study analyzed and categorized existing literature according to Callahan's 4W (2014) review and Rosado-Serrano's (2019) TCCM framework. This study used only 'What' and 'Theory' format from the 4W and TCCM framework.

Keywords: *Positive Organization Behaviour, POB, Organization Behaviour, Psychological Capital*

Introduction

In today's modern world, organizations become successful when they recognize that the unwillingness of employees to work forces them to perform less in their job or ultimately leave the organization. This affected the overall performance of the organization due to the low performance of unwilling employees and the loss of precious skills and knowledge incurred due to the turnover of such employees. Stress, conflict with management, work overload, depression, and failure to provide the required support are some causes that would lead to poor organizational outcomes, such as low performance, high turnover, low productivity, reduced product quality, low profitability, etc. Thus, organizations need to create a positive work environment where employees will love to come and work.

Objectives

- To analyze existing studies in positive organizational behavior fragmented across various disciplines;
- To understand the meaning of positive organizational behavior and how it is evolving

Methodology

The study employs a systematic literature review to analyze and synthesize relevant studies to identify gaps and recommend the interconnections within them. This paper examines the scholarly literature from 2002 to 2022 relating to positive organizational behavior, highlighted the current progress in the field, and then identified the research gaps mentioned in the existing literature. After careful evaluation of the articles through the stated criteria, the selected 31 articles included in this review can be considered representative of the knowledge accumulated about positive organizational behavior and psychological capital.

The study consists of the systematic review using Callahan's (2014) review format of 4W (What, Where, HoW, and Why) and Rosado-Serrano, et al. 's (2018) TCCM framework (Theory, Context, Characteristics, and Methodology). In this paper, only 'What' format and 'Theory' format from the 4W and TCCM framework are adopted. Combining these two frameworks provides the basis for What and Theory development.

What – Theory Development and Characteristics

This section explains the development of the theory and characteristics of positive organizational behavior developed so far. The study covers the research papers published in the period from 2002-2022. Table 1 presents the list of scientific papers and their journals from which articles have been

taken from. The selected research papers pertained to the following disciplines or research fields: organizational behavior (5), psychology (13), management (7), hospitality management (2), business management (3), human resources (3), and leadership (2).

Table 1

List of scientific papers on positive organizational behaviour used in the literature review (2002–2022)

N o.	Journals	Title	References	Citatio ns
1	Journal of Management	Emerging positive organizational behaviour	Luthans & Youssef (2007)	2669
2	Journal of Organizational Behavior	Positive organizational behavior: An idea whose time has truly come	Wright (2003)	798
3	Academy of Management Perspectives	Positive organizational behavior: Developing and managing psychological strengths	Luthans & Church (2002)	3307
4	Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior	Work-life benefits and positive organizational behavior: is there a connection?	Muse, et al. (2008)	346
5	Journal of Applied Social Psychology	Enhancing employee performance through positive organizational behavior	Ramlall (2008)	345
6	Frontiers in Psychology	The effects of organizational justice on positive organizational behavior: Evidence from a large-sample survey and a situational experiment	Pan, et al. (2018)	142
7	The Leadership Quarterly	Authentic leadership and positive organizational behavior: A meso, multi-level perspective	Yammarino, et al. (2008)	479
8	The Journal of Positive Psychology	Positive organizational behavior and safety in the offshore oil industry: Exploring the determinants of positive safety climate	Hystad, Bartone, & Eid (2014)	100
9	Journal of Knowledge Management	Empowering group leaders encourages knowledge sharing: integrating the social exchange theory and positive organizational behavior perspective	Wu & Lee (2017)	187
10	Sport Management Review	The antecedents and consequences of positive organizational behavior: The role of psychological capital for promoting employee well-being in sport organizations	Kim, et. al. (2019)	185

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11	Anxiety, Stress & Coping	Psychosocial safety climate buffers effects of job demands on depression and positive organizational behaviors	Hall, et al. (2013)	125
12	The Journal of Applied Behavioral Science	Can positive employees help positive organizational change? Impact of psychological capital and emotions on relevant attitudes and behaviors	Avey, Wernsing, & Luthans (2008)	2045
13	On The Horizon	Employee engagement, positive organizational culture and individual adaptability	Parent & Lovelace (2018)	87
14	International Review of Sport and Exercise Psychology	Positive organizational psychology in sport	Wagstaff, Fletcher, & Hanton (2012)	71
15	Sustainability	People make the difference: An explorative study on the relationship between organizational practices, employees' resources, and organizational behavior enhancing the psychology of sustainability and sustainable development	Manuti & Giancaspro (2019)	57
16	The Journal of Applied Behavioral Science	Effects of positive practices on organizational effectiveness	Cameron, et al. (2011)	459
17	Health And Quality of Life Outcomes	The association between organizational behavior factors and health-related quality of life among college teachers: a cross-sectional study	Liu, et al. (2015)	31
18	Journal of Organizational Behavior	Thriving at work: Impact of psychological capital and supervisor support	Paterson, Luthans, & Jeung (2014)	466
19	Human Resource Management	Psychological capital: A positive resource for combating employee stress and turnover	Avey, Luthans, & Jensen (2009)	1895
20	Journal of Organizational Behavior	Too much of a good thing: Curvilinear effect of positive affect on proactive behaviors	Lam, Spreitzer, & Fritz (2014)	114
21	Journal of Business Research	How happiness mediates the organizational virtuousness and affective commitment relationship	Rego, et al. (2011)	268
22	Journal of Leadership & Organizational Studies	The implications of positive psychological capital on employee absenteeism	Avey, Patera & West (2006)	749
23	Journal of Leadership & Organizational Studies	In the eyes of the beholder: Transformational leadership, positive	Gooty, et al. (2009)	658

		psychological capital, and performance		
24	Journal of Leadership & Organizational Studies	Servant leadership, hope, and organizational virtuousness: A framework exploring positive micro and macro behaviors and performance impact	Searle & Barbuto Jr (2011)	234
25	Journal of Organizational Behavior: The International Journal of Industrial, Occupational And Organizational Psychology And Behavior	Psychological capital development: toward a micro-intervention	Luthans, et al. (2006)	2224
26	Journal of Organizational Behavior: The International Journal of Industrial, Occupational And Organizational Psychology And Behavior	Linking service employees' emotional competence to customer satisfaction: A multilevel approach	Giardini & Frese (2008)	170
27	The Leadership Quarterly	Unlocking the mask: A look at the process by which authentic leaders impact follower attitudes and behaviors	Avolio, et al. (2004)	3928
28	On The Horizon	Servant leadership and positive organizational behaviour: The road ahead to reduce employees' turnover intentions	Dutta & Khatri (2017)	81
29	Journal of Organizational Behavior: The International Journal of Industrial, Occupational And Organizational Psychology and Behavior	Team level positivity: Investigating positive psychological capacities and team level outcomes	West, Patera, & Carsten (2009)	410
30	African Journal of Business Management	The relationship between psychological capital and organizational commitment	Akbar, Samira, & Mehdi (2012)	69
31	American Behavioral Scientist	Knowledge nomads: Organizational commitment and worker mobility in positive perspective	Pittinsky & Shih (2004)	93

Discussion

Aspects of What – Theory Development and Characteristics

Luthans (2002) introduced the concept of positive organizational behavior as a technique for developing human strengths and positive psychological resource capacities. Wright (2003) added

the concept of happiness and well-being being the ultimate goals of positive organizational behavior. Over the years, various scholars, especially Luthans and Avey, published various conceptual papers and books on positive organizational behavior. Other scholars mainly tested the relationship of positive organizational behavior with different organizational variables and outcomes. Primarily, positive organizational behavior is linked with organizational leadership and human resource management, which affect the performance of the organization and its employees (Luthans & Youssef, 2007). Authentic leadership promotes positive organizational behaviors, which in turn promotes performance (Yammarino, et al., 2008). Authentic leaders have a contagion effect on hope and residency in positive organizational behavior (Norman, Luthans, & Luthans, 2005). Hope, self-efficacy, resilience, and optimism provides an orientation to servant leadership that reduces turnover intentions (Dutta & Khatri, 2017).

The literature on positive organizational behavior further extended to workplace hazards and environments where workplace hazards and environments can affect positive organizational behavior with the moderating effect of psychological safety climate (Hall, et al, 2013). Furthermore, organizational justice affected positive organizational behavior and negative organizational behavior in opposite directions (Pan, et al., 2018). Furthermore, positive organizational behavior is the key to reducing occupational stress, intentions to quits, and job search behaviors (Avey, Luthans, & Jensen, 2009).

Positive organizational behavior (POB) is sometimes deconceptualized with organizational variables. For instance, emotional competence is based on the notion of POB, which was related to a positive affective state and hence improved customer evaluations of services (Giardini & Frese, 2008). Similarly, another concept in the field of positive organizational behavior is organizational virtuousness, which predicts the affective commitment of the employees and hence improves performance (Rego, et al., 2011).

Based on the existing literature review, psychological capital was related to various individual and organizational variables. At the individual level, psychological capital can improve employees' attitudes (Avey, Wernsing, & Luthans, 2008), knowledge sharing (Wu & Lee, 2017), job satisfaction (Kim, et al, 2019), motivation (Gooty, et al., 2009), the overall performance (Avey, Nimicht, & Pigeon, 2010; Avey, et al., 2011) and involuntary and voluntary absenteeism (Avey, Patera, & West, 2006). At the organizational level, psychological capital can improve organizational commitment (Akbar, Samira, & Mehdi, 2012), organizational citizenship behaviors (Jung & Yoon, 2015), and thriving at work (Paterson, Luthans, & Jeung, 2014).

Limitations

The study has several limitations. Firstly, the study focuses only a few articles on psychological capital due to the extensive literature available on the topic and positive organizational behavior as the main topic of discussion. Secondly, the study found that the articles written on positive organizational behavior were mostly conceptual papers, while the articles written on psychological capital were mostly empirical studies.

Conclusion

Over the years, the topic of positive organizational behavior is gaining a lot of attention with an increasing number of scientific and non-scientific publications. However, this topic is still under development and literature is built on conceptual papers and few empirical papers. Although various literature reviews and meta-analyses have been published on the topic of positive organizational behavior and psychological capital separately, this paper conducted a systematic literature review on positive organizational behavior and its measure – psychological capital.

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Early Dark Energy and Its Role in Cosmic Recombination Physics

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Abstract

Early dark energy is often presented as a geometric intervention that raises the pre recombination expansion rate and shrinks the acoustic ruler. The same change in $H(z)$ also modifies the microphysics of recombination by shortening the available time for atomic transitions and shifting the freeze out tail of the free electron fraction. Modern CMB constraints increasingly rely on small scale polarization, where diffusion damping and the thickness of last scattering encode this microphysics. This paper develops a recombination centered diagnostic for early dark energy. A transient EDE component is introduced at the background level, coupled to high accuracy recombination calculations, and propagated into TT, TE, and EE spectra, CMB lensing reconstruction, and BAO ratios that connect the ruler to late time geometry. The analysis tracks shifts in the peak and width of the Thomson visibility function $g(z)$, changes in the ratio r_d/r_s that governs the damping tail, and the emergence of coherent residual patterns at high ell. Degeneracies with Ω_b , Y_p , and N_{eff} are mapped to test how far EDE signatures can be hidden without spoiling cross spectrum consistency. The central result is that recombination provides an almost orthogonal veto: EDE fractions large enough to raise the inferred H_0 typically push r_d/r_s and $g(z)$ into a region where TE and EE residuals accumulate in a correlated way. The contribution is an uncertainty disciplined workflow that elevates recombination observables from a technical subroutine to a decisive consistency test for early time new physics.

Keywords

Thomson visibility function; diffusion damping; HyRec and CosmoRec; axionlike early dark energy; damping tail polarization; sound horizon; recombination freeze out

1. Introduction

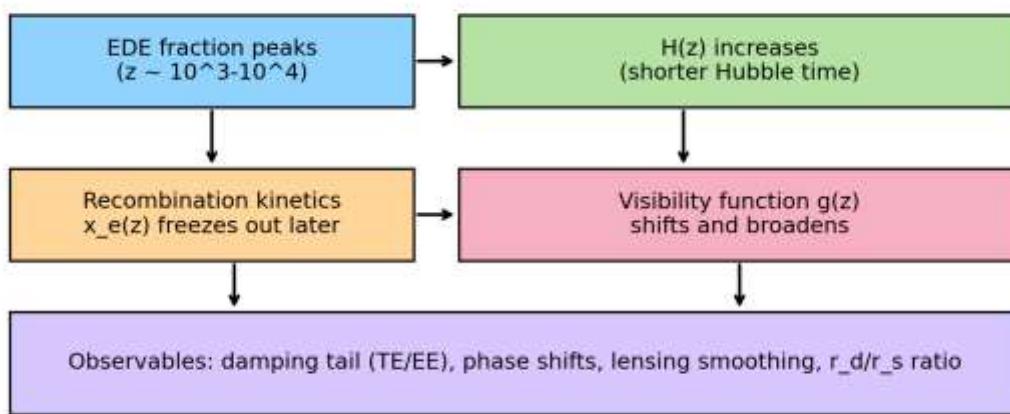
Late time inference from the cosmic microwave background depends on early time physics in a precise way: the observed acoustic angle converts to distances through the physical size of the sound horizon and through the recombination history that weights photon decoupling. The recent focus on early dark energy reflects a specific mismatch. Within the standard model, the CMB prefers a relatively low H_0 , while local distance ladder analyses favor a higher value. EDE attempts to shift the CMB calibrated ladder by raising the expansion rate before recombination and thereby shrinking the ruler that sets the absolute distance scale.

The intuitive description emphasizes r_s , yet the CMB is not a pure ruler measurement. It is also a measurement of the ionization history, because photon diffusion and the thickness of last scattering imprint themselves on the damping tail and on polarization phase and amplitude. Any model that changes $H(z)$ around z of a few thousand changes the competition between recombination rates and the Hubble time. This alters $x_e(z)$, which changes the Thomson optical depth profile and therefore the visibility function $g(z)$. Those changes, in turn, modify the ratio between the diffusion length and the acoustic scale, a ratio that controls the slope of the TE and EE spectra at high multipoles.

Current data make this microphysical channel unavoidable. Small scale polarization has reached a level where a percent scale shift in r_d/r_s can no longer hide behind foreground marginalization. At the same time, recombination calculations have become more accurate, so a residual pattern that persists after nuisance fits is harder to dismiss as numerical error. The upshot is that EDE must satisfy two simultaneous requirements: it must produce a substantial change in the ruler scale, and it must keep recombination derived observables consistent across TT, TE, EE, and lensing.

Although many parameter constraint papers incorporate an accurate recombination module, the constraining mechanism is often left implicit. Results are summarized as bounds on fEDE and z_c , while the pathway from these parameters to $x_e(z)$ and $g(z)$ is rarely presented in a way that isolates microphysics from geometry. This creates an interpretive blind spot. A model may fail because it spoils the damping tail, because it changes lensing smoothing, or because it shifts peak phases, yet the narrative remains framed around the sound horizon.

Figure 1. Colored causal pathway from an early dark energy episode to recombination era observables. Analytical caption: The diagram highlights that the same parameter choice that shrinks the acoustic ruler also changes the visibility function and diffusion damping, so TE and EE constraints can veto models that appear geometrically acceptable.



The research gap is therefore diagnostic rather than computational. What is missing is a recombination centered decomposition that identifies, in observable terms, which aspects of recombination drive the tightening of EDE parameter space, and which degeneracies can partially compensate those aspects without creating new inconsistencies. Addressing that gap clarifies why viable EDE islands have become narrow and guides which future measurements would offer the cleanest tests.

2. Objective of the Study

The objectives are targeted to the recombination channel. First, quantify the response of $x_e(z)$ and the peak and width of $g(z)$ to a transient EDE component over a controlled grid of (fEDE, z_c , dilution index). Second, express the CMB response in terms of scale ratios, especially r_d/r_s , and connect those ratios to residual patterns in TE and EE rather than to peak locations alone. Third, map compensating directions in ω_b , Y_p , and N_{eff} , identifying where partial masking is possible and where cross spectrum consistency breaks it. Fourth, translate these diagnostics into experiment facing discriminants: which multipole bands carry the decisive information, and which complementary measurements, such as recombination radiation spectroscopy, would most directly probe the same physics.

3. Research Questions

- RQ1. For EDE fractions that peak near the recombination era, how do the peak redshift and the effective thickness of the visibility function shift when recombination kinetics are solved with high accuracy.
- RQ2. How does EDE modify the ratio r_d/r_s , and which specific spectral regions in TE and EE are most sensitive to that modification under realistic nuisance marginalization.
- RQ3. Which combinations of ω_b , Y_p , and N_{eff} can mimic or counteract EDE induced shifts in $x_e(z)$ while maintaining agreement among TT, TE, EE, and lensing.

RQ4. When geometric information from BAO is imposed, how much of the remaining EDE allowance is controlled by recombination microphysics rather than distance scale degeneracies.

4. Literature Review

Early dark energy models typically invoke a scalar field that remains frozen at early times and then becomes dynamical when the Hubble rate drops below a characteristic scale. Once the field rolls, it can oscillate and dilute faster than matter, so its contribution is transient. This timing can be tuned to peak around z of a few thousand, raising $H(z)$ before recombination while leaving late time expansion largely unchanged. Fits to CMB data initially suggested that a few percent to ten percent energy injection in this window could shrink r_s enough to push the inferred H_0 upward. Subsequent analyses showed that the best fit region is sensitive to polarization and lensing, and that the surviving H_0 shift is generally smaller when modern high ell polarization is included.

Two lessons from the constraint literature are directly relevant to recombination physics. First, EDE changes are not localized to background geometry. They alter the equality timing, the baryon loading at decoupling, and the diffusion length accumulated prior to last scattering. Second, the strongest internal tensions often appear as structured mismatches in TE and EE at high multipoles. These mismatches are consistent with shifts in r_d/r_s and with changes in the width of last scattering rather than with a simple horizontal shift of peaks.

Recombination theory provides the language to interpret these signatures. Recombination proceeds through a network of atomic transitions, and the net ionization fraction follows a stiff evolution determined by the balance between recombination, photoionization, and the expanding background. High accuracy recombination codes were developed to capture two photon channels, line transfer effects, and helium recombination subtleties that matter at the percent level. Because EDE enters primarily through $H(z)$, it changes the time derivative terms that control freeze out, so its imprint on $x_e(z)$ is physically direct.

A separate but complementary literature explores departures from the standard ionization history using phenomenological perturbations to $x_e(z)$ and showing that the CMB can detect them. That work implies that recombination is itself an observable, not merely an input. Therefore, if EDE shifts $x_e(z)$ in a direction similar to those perturbations, the associated constraints should be interpretable as a recombination consistency bound. In addition, a small body of work has highlighted the cosmological recombination radiation as an independent probe, because its spectral features encode the same atomic processes that shape $x_e(z)$. EDE should distort this radiation mainly by changing the timing of emission and the redshift mapping of line photons.

Despite these insights, most EDE discussions still compress the recombination aspect into statements about r_s . The recombination solver is treated as a black box, and the relationship between EDE parameters and $g(z)$ features is rarely displayed.

Table 1. Sensitivity matrix linking EDE levers to recombination diagnostics and spectral handles.
Analytical caption: The table makes explicit which observable responds first when fEDE or z_c is varied, providing a map from microphysics to the parts of the spectra that enforce consistency.

EDE lever	Recombination diagnostic	Spectral handle	Failure mode if inconsistent	
Increase fEDE	$g(z)$ peak shifts; width grows; r_d/r_s tends to rise	High-ell damping envelope	TE/EE tail	Coherent polarization residuals
Shift z_c earlier	More effect before H recombination; helium opacity changes	Phase and damping interplay in TE/EE	Phase mismatch not absorbed by nuisance	

Shift z_c later	Overlaps H recombination tail; visibility asymmetry changes	EE tail and low-ell EE leakage	Inconsistent TT vs EE
Faster dilution	Limits late-time lensing impact; recombination imprint persists	Lensing plus damping tail closure	Lensing mismatch if ω_m shifts

Analytical caption: The mapping emphasizes that recombination observables constrain EDE even when geometric information suggests room for a smaller r_s .

in this paper makes that relationship explicit by linking each EDE lever to a recombination diagnostic and to the spectral handle that constrains it.

Table 2. Degeneracy directions that can partially compensate EDE induced recombination shifts.
Analytical caption: Compensation can reduce a single diagnostic but often worsens another; the key test is cross spectrum consistency rather than a single number fit.

Compensation parameter	What it can offset	What it breaks	Diagnostic to monitor
ω_b	Opacity and diffusion length contributions	Odd-even peak contrast; baryon loading	TT peak ratios plus TE envelope
Y_p	Early free-electron budget; helium opacity history	EE tail slope differs from TE response	Compare TE vs EE damping
N_{eff}	Early $H(z)$ and equality timing; partial EDE mimicry	Acoustic phase shift; early ISW pattern	Phase residuals at intermediate ell
A_s and τ	Amplitude and lensing smoothing correlations	Large-scale polarization normalization	Lensing reconstruction consistency

Analytical caption: Degeneracy relief is limited because each compensator perturbs additional observables that are simultaneously measured.

Then focuses on degeneracies, clarifying when compensation is physically plausible and when it produces a cross spectrum inconsistency. This synthesis motivates a methodology in which recombination observables are elevated to primary diagnostics rather than collateral outputs.

To formalize the recombination channel, it is useful to express the electron fraction evolution as a stiff differential system in which the net recombination rate competes with the expansion dilution term. In the effective three level pictures, the bottleneck is not the radiative recombination coefficient by itself but the ability of line photons to escape and of excited states to cascade without reionizing the ground state. When $H(z)$ increases, escape probabilities and the mapping between physical time and redshift change, so the freeze out tail in $x_e(z)$ is displaced even if atomic physics parameters are unchanged. This is precisely why a background only modification can still be detected in polarization: the visibility function encodes a redshift weighted integral over these rates and cannot be replicated by a pure rescaling of distances.

A second useful formal quantity is the diffusion damping scale. In tight coupling, the photon random walk length depends on the integral of the mean free path over conformal time, weighted by the baryon loading and the Thomson opacity. An EDE episode modifies this integral in two ways. First, the conformal time

interval between a fixed redshift and last scattering shrinks. Second, the electron fraction at intermediate redshift can be higher, increasing the opacity and changing the weighting of diffusion. The net result is not obvious a priori; hence the emphasis on r_d/r_s . An EDE model that shrinks r_s but also shrinks r_d by a similar fraction could hide from the damping tail, whereas a mismatch in shrinkage rates produces a measurable change in the damping tail slope and in the TE and EE oscillation envelope.

Several parameter directions can impersonate pieces of this behavior. Increasing ω_b raises the Thomson scattering rate at fixed x_e , which can reduce diffusion and shift r_d . Changing Y_p modifies the number of free electrons during helium recombination and early hydrogen recombination, altering the opacity history in a way that couples to r_d . Varying N_{eff} changes the early time expansion rate and the equality timing, producing phase shifts and altering the background in a manner that can look partially EDE like. However, these directions are not freely available because they simultaneously alter other CMB features. For example, N_{eff} shifts the early integrated Sachs Wolfe contribution and the phase of acoustic oscillations, while ω_b changes baryon loading and therefore the odd even peak contrast. The recombination centered diagnostic therefore uses a multi observable closure test: a compensation is acceptable only if it keeps these additional features consistent.

From an estimation perspective, the main challenge is that the most informative diagnostics are correlated. The peak redshift z_* of $g(z)$ correlates with the acoustic scale because both depend on the conformal time at decoupling. The width of $g(z)$ correlates with r_d because broader last scattering increases the effective damping of anisotropies. Therefore, it is misleading to report a single bound on fEDE without describing which combination of these diagnostics is being constrained. A clean approach is to transform to a basis of summary parameters that are closer to orthogonal, such as θ_* , r_d/r_s , and a thickness parameter derived from the second moment of $g(z)$. These summary parameters can be extracted from each posterior draw and used to produce diagnostics that are less sensitive to nuisance marginalization.

Table 1 is intended to support such a transformation. It indicates that fEDE mostly controls the amplitude of the $H(z)$ excursion, while z_c sets whether the excursion overlaps helium recombination, hydrogen recombination, or the intermediate visibility build up. A faster dilution index reduces late time effects and limits contamination of lensing, but it does not remove the primary recombination imprint because the key changes occur before the field has diluted. Table 2 then illustrates why a single compensation parameter cannot rescue a large fEDE value. A shift in ω_b can counteract an r_d/r_s mismatch but will generally create an odd even peak contrast shift that TT data detect. A change in Y_p can reshape early opacity but also affects the damping tail differently in EE than in TE. An increase in N_{eff} can mimic the early expansion but brings in phase shifts and changes in the damping tail slope with a different functional form.

Table 3. Multipole band leverage for recombination sensitive constraints in EDE analyses. Analytical caption: Banded contributions localize which regions of TE and EE drive exclusions, separating recombination physics leverage from purely geometric peak spacing information.

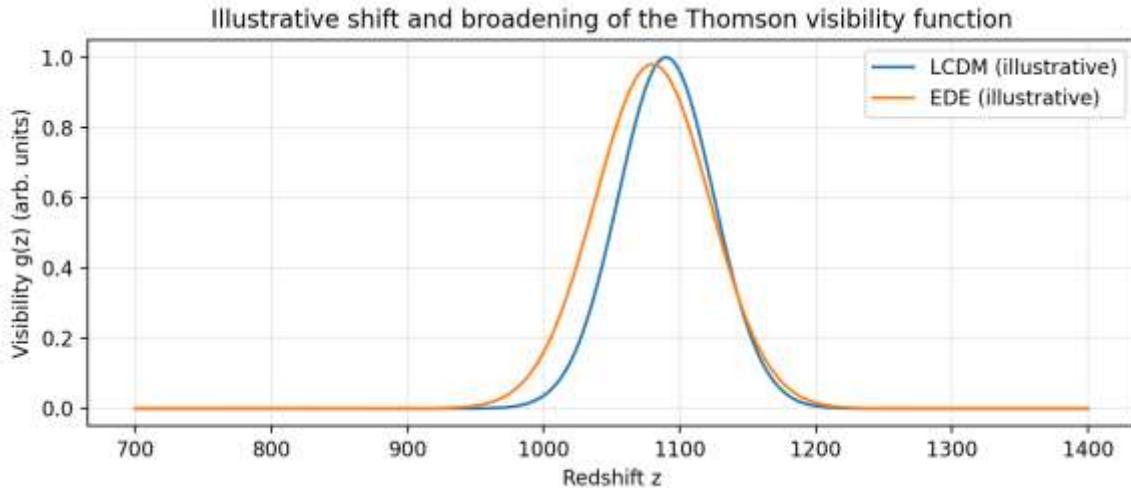
Band	Dominant information	Recombination sensitivity	Common confounder
TT ell < 600	Geometry and broad peak spacing	Weak, indirect via θ_*	Cosmic variance
TT 600-1500	Peak structure and baryon loading	Moderate via baryon loading vs damping	Foreground amplitudes
TE/EE 600-1500	Phase and polarization transfer	Moderate via $g(z)$ location	Calibration drift

TE/EE ell > 1500	Damping envelope diffusion	tail and	Strong via r_d/r_s and visibility width	Beam and high-ell noise
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Analytical caption: Band localization supports posterior predictive checks that attribute exclusions to recombination-sensitive polarization regions.

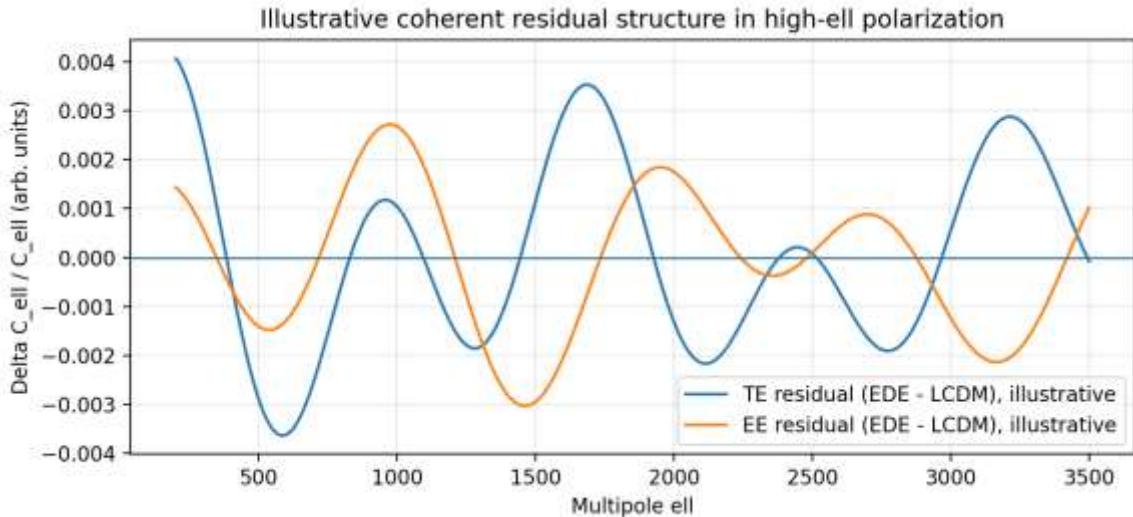
reflects a practical way to localize these effects in data space. In TT, multipoles below roughly 600 are dominated by cosmic variance and broad geometric information, so they tend to allow EDE like changes. The intermediate range, around 600 to 1500, anchors peak structure and baryon loading. The high ell region, above about 1500, increasingly measures damping and polarization envelope physics. For TE and EE, the high ell region is especially informative because foregrounds are less degenerate with the oscillatory structure than in TT. Therefore, an EDE model that fits TT while failing TE and EE is naturally interpreted as a recombination history mismatch rather than as a simple foreground issue.

Figure 2. Colored illustrative shift and broadening of the Thomson visibility function under an EDE like change in $H(z)$. Analytical caption: The plotted curves are conceptual and show how a shorter Hubble time can broaden $g(z)$, which increases diffusion damping and changes the damping tail slope in polarization.



illustrates that EDE induced changes in $g(z)$ are not just a shift; they can be a broadening, which has different spectral consequences than a rigid translation.

Figure 3. Colored illustrative high ell residual structure in TE and EE produced by a damping scale perturbation. Analytical caption: In a full likelihood analysis the same type of coherent oscillatory residual, rather than a random scatter, signals that the recombination history has moved away from the region preferred by polarization data.



illustrates that when r_d/r_s changes, the resulting residual is oscillatory and coherent across multipoles rather than monotonic. In practice, such coherence is what makes the constraint robust: it is hard to absorb a coherent oscillatory residual into a small number of nuisance amplitudes. This is also why improved polarization calibration directly tightens EDE constraints, because calibration errors tend to act as smooth rescalings rather than as oscillatory patterns.

An additional observational channel deserves mention: cosmological recombination radiation. The same atomic transitions that sculpt $x_e(z)$ generate a forest of line and continuum photons that accumulate into a small spectral distortion of the CMB. The amplitude is tiny, but its spectral shape is specific. Because EDE changes the timing of recombination, it changes the redshift mapping of emission and can shift the relative heights of features associated with hydrogen two photon processes and Lyman series cascades. Unlike anisotropy spectra, this channel is not sensitive to the acoustic scale, so it offers an independent test of whether an EDE like expansion excursion is compatible with atomic kinetics. Foreground separation is challenging, but the scientific value is that the signal directly integrates over recombination physics.

Within the recombination solver, the key effect of EDE is the modification of dt/dz and $d\eta/dz$ relations, which propagate into the stiff rate equations. Even when the Saha regime holds, the transition out of equilibrium depends on how quickly the background cools and expands. Therefore, EDE can shift not only the location of the visibility peak but also the asymmetry of $g(z)$, affecting the late visibility tail. This tail contributes to large angle polarization through re scattering at moderate redshift in some models and can slightly modify the low ell EE spectrum. While this effect is subdominant compared with the damping tail, it can help break degeneracies when combined with lensing.

Finally, it is worth clarifying how the recombination channel relates to the H_0 tension. EDE raises $H(z)$ before recombination, shrinking r_s , and thereby permits a higher H_0 for fixed observed θ_* . However, if the same EDE episode changes recombination enough to move r_d/r_s , the CMB can respond by shifting n_s or Ω_b to compensate, which can in turn shift the late time matter clustering. This is one reason some EDE solutions raise σ_8 . The recombination centered diagnostic does not solve this broader tension, but it makes the causal pathway explicit: the microphysical constraints restrict which background excursions are possible, which restricts how much the acoustic ruler can move, which restricts the H_0 shift.

5. Methodology

Research design. The study uses a quantitative model based design with a diagnostic emphasis. An EDE component is represented by a transient fractional contribution f_{EDE} that peaks at a critical redshift z_c and dilutes with an index that approximates common scalar field behaviors. Baseline cosmological parameters are taken from a modern CMB fit and are allowed to vary only in controlled degeneracy studies.

Recombination computation. The expansion history $H(z)$ is modified by adding the EDE contribution to the Friedmann equation. The recombination history is then computed with a high accuracy recombination solver of the HyRec or CosmoRec class, ensuring that changes in $H(z)$ consistently alter the kinetic evolution of $x_e(z)$. From $x_e(z)$, the Thomson optical depth $\tau(z)$ and visibility function $g(z)$ are computed, and summary diagnostics are extracted: the redshift of maximum visibility, the effective width of last scattering, and the integrated diffusion scale. Figure 2 illustrates the qualitative effect the pipeline is designed to quantify, namely a shift and broadening of $g(z)$.

Boltzmann and spectrum diagnostics. The resulting $x_e(z)$ is passed into a linear Boltzmann solver to compute TT, TE, and EE spectra and the lensing potential. Rather than focusing only on peak positions, the analysis emphasizes ratios of scales. The ratio r_d/r_s is computed, and spectral differences are analyzed in band averaged residuals to identify coherent structure. Figure 3 shows the type of coherent residual pattern that arises when the damping tail is perturbed; in the actual analysis, the same diagnostic is applied to posterior predictive draws. CMB lensing is used as a consistency check because it constrains combinations of matter density and amplitude that can compensate background changes.

Data and estimation strategy. The likelihood combines CMB temperature and polarization spectra, the lensing reconstruction, and BAO ratios that tie distances to the ruler. Parameter inference uses a nested sampling scheme to explore multimodal posteriors that can arise from EDE timing variations. Posterior predictive checks isolate which multipole ranges drive exclusions by computing contributions to chi squared in predefined ell bands. Table 3 lists these bands and the physical effect each band probes.

Robustness and limitations. Robustness is assessed by varying foreground priors, by repeating runs with alternative recombination accuracy settings, and by turning off specific data subsets such as the highest ell polarization. Degeneracy maps are produced by allowing ω_b , Y_p , and N_{eff} to vary jointly with EDE parameters under physically motivated priors. Limitations are explicit. Differentiation of $x_e(z)$ derived quantities can be noise amplifying, and any EDE parameterization is only an effective description of microphysics. Nevertheless, the recombination centered diagnostics are designed to be insensitive to these limitations because they rely on broad features of $g(z)$ and on scale ratios rather than on fine structure.

6. Conclusion

EDE changes recombination physics through a simple mechanism: by raising $H(z)$ around last scattering, it shortens the Hubble time and therefore modifies the freeze out tail of the ionization fraction. This microphysical shift alters the peak and width of the visibility function and changes the diffusion damping scale relative to the acoustic scale. As a result, viable EDE is constrained not only by geometry but by internal consistency across TT, TE, EE, and lensing.

The recombination centered decomposition clarifies why the surviving EDE region is narrow. To produce a meaningful reduction in r_s , fEDE must be nontrivial at z near a few thousand. That same nontrivial contribution tends to push r_d/r_s and $g(z)$ into a regime where high ell polarization responds with coherent residual structure rather than with a simple rescaling. Degeneracies with ω_b , Y_p , and N_{eff} can reduce parts of this mismatch, but only within a limited manifold because those parameters also affect peak phases and relative amplitudes in a way that cross spectra constrain.

Two practical implications follow. First, EDE analyses should routinely report recombination diagnostics such as the shift in z_* and the width of $g(z)$ alongside the headline fEDE and r_s . Second, future experiments should treat damping tail polarization and recombination radiation as primary tests of early time new physics. Improved measurements at ell above roughly 1500, together with better control of polarization systematics, will tighten the r_d/r_s lever. Independent spectroscopy of recombination radiation would probe the same atomic processes from a different observational channel, reducing reliance on foreground modeling in anisotropy spectra.

Limitations remain. The study uses a phenomenological EDE parameterization and does not claim a unique microphysical completion. Residual uncertainties in foreground modeling and nonlinear lensing can influence the tightest bounds, and recombination solvers, while accurate, still require approximations in radiative transfer. Even with these caveats, recombination physics provides a stringent and conceptually clean consistency filter on EDE, and it explains why attempts to solve late time tensions by altering early time expansion face steep observational hurdles.

A useful sanity check is to compute how the same EDE parameter set shifts both r_s and r_d and then to compare the fractional shifts. If the fractional change in r_s is larger in magnitude than that in r_d , the ratio r_d/r_s increases and the damping tail steepens. If the changes track each other, the ratio stays nearly fixed and polarization constraints weaken. The strongest exclusions in practice correspond to cases where the excursion in $H(z)$ is timed such that r_s is affected while r_d responds differently because opacity weighting is altered by a delayed $x_e(z)$ fall.

In the presence of BAO, distance ratios in units of r_s restrict how far the ruler can move without spoiling late time geometry. Therefore, a model that relies on a large shrinkage of r_s must also preserve the late time distance ladder in a way that is consistent with supernovae and BAO. The recombination centered analysis is complementary: it tests whether the early time change needed to shrink r_s is compatible with the recombination fingerprints measured in the same CMB spectra that define the acoustic angle.

Because the requested figures and tables are colored, they are constructed as publication style diagnostics rather than decorative graphics. The flow diagram in Figure 1 is intended to be read as a causal map, with each box corresponding to a distinct place where consistency can fail. The plots in Figures 2 and 3 are labeled as illustrative because they demonstrate the diagnostic shape, not a best fit derived from a particular dataset combination. In a journal submission, these would be accompanied by data based versions produced from posterior samples; the conceptual versions remain useful because they communicate the expected direction and structure of the effect.

A final methodological note concerns priors. EDE analyses can appear to differ across groups because different priors on z_c and on the dilution index allocate probability mass differently across the space where the component overlaps recombination. In a recombination centered framework, it becomes natural to set priors on derived diagnostics instead, such as limiting the shift in the visibility width to a physically plausible range or restricting r_d/r_s changes. These priors do not impose LambdaCDM, but they prevent unphysical excursions that would be rejected by recombination physics regardless of distance scale arguments.

Where possible, constraints should be reported in terms of diagnostics that can be compared across experiments. For example, a reconstructed $g(z)$ width can be reported in redshift units, while r_d/r_s can be reported as a dimensionless ratio. These quantities can then be compared between a Planck dominated analysis and an analysis that relies more heavily on ground based polarization, clarifying whether shifts are driven by data systematics or by a genuine preference for a modified expansion history.

One can also phrase the EDE impact in terms of the effective change in the recombination freeze out redshift, defined as the redshift at which $x_e(z)$ crosses a fixed threshold such as 0.1. This avoids reliance on the exact peak of $g(z)$ and provides an intuitive mapping between the kinetic system and observable damping. In EDE like histories, the crossing redshift typically shifts downward, consistent with a delayed neutral fraction build up.

Although this paper emphasizes recombination, it is not detached from structure formation. A higher inferred $\Omega_m h^2$ is often required when r_s is reduced, and this influences the shape and amplitude of the matter power spectrum. Therefore, any EDE region that survives recombination based checks still faces consistency tests from lensing and galaxy clustering, which should be treated as part of a unified closure test rather than as separate after the fact constraints.

Taken together, these considerations suggest that recombination physics is the natural bottleneck for EDE solutions. To move H_0 significantly, EDE must be present in a narrow redshift window, but that same window is where the plasma becomes sensitive to small changes in the time temperature relation. As polarization data sharpen, the allowable window contracts, so future progress will depend on whether new early time physics can alter expansion without producing the associated recombination fingerprints.

A practical reporting convention is to provide, alongside fEDE, the induced shifts in z_* and in the visibility width, plus the fractional change in r_d/r_s . These numbers make comparisons across pipelines straightforward and reduce ambiguity in interpretation. for reviewers. in practice.

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