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Organizational Initiatives to Enhance Employee Well-Being Preventing/Reducing the Onset of Non-Communicable Diseases in the Workplace

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Abstract *This paper discusses a system of preventing/reducing the onset of NCDs in communities of employees across different world class companies in India. The system comprises a description of indicators which endeavor to measure the extent of health care initiatives, in the area of NCDs, practiced by these organizations. These are the Input indicators. The system also includes output indicators to assess the effectiveness of the initiatives.*

Analyzing the data obtained from 12 companies, with the help of a questionnaire, the research comes up with the finding that the linkages between Input Indicators and Output Indicators are mostly statistically significant, valid at 10% level of significance in some cases and 17% significance in other cases.

Also, the trend analysis on output indicators over last two years shows substantial improvement.

Keywords *NCDs, Indian Companies, Indicators, Healthcare, Employees*

INTRODUCTION

NCD and Its Relevance

Non-communicable diseases (NCD), also known as chronic **diseases**, are not passed from person to person. They are of long duration and generally slow progression. Primarily, these are cardiovascular **diseases**, cancer, diabetes and chronic respiratory **diseases**, and their key risk factors – tobacco, harmful use of alcohol, unhealthy diet and physical inactivity – remain the leading causes of death globally. NCDs account for two thirds of deaths which occur in the global scenario, as observed in 2008 (Ketkar, Velaswami, Prabhu, & Maiya, 2015). These diseases are characterized as being very gradual and slow in manifesting and taking effect. But at the same time they are long in duration (Ketkar et al., 2015) [1]. Diseases such as heart problems, diabetes, chronic respiratory disease, stroke and some cancers, also come under the definition of NCD (Lozano et al., 2012). The incidence of diseases has been steadily increasing, and has had severe impacts on many countries and people of all ages and socio-economic groups (WHO 2010).

As indicated above, the NCDs share a common though modifiable set of risk factors that has been shown to play a role in reducing the prevalence of NCDs. This set includes tobacco use, an unhealthy diet, excessive alcohol consumption and physical inactivity (Beaglehole et al., 2011). Other risk factors for NCD include: age, elevated blood pressure, dyslipidemia, elevated serum cholesterol and glucose concentrations, waist circumference, Body Mass Index more than 25 kg/m2 [9]. If the risk factors could be eliminated or even reduced it could prevent up to 80 % of heart disease, stroke and type 2 diabetes, and more than one third of cancers (WHO, 2013).

If the global prevalence of physical inactivity could be reduced, between 6-10% of all deaths due to NCD's could be avoided (Lee et al., 2012). Lee et al. calculated that by increasing the prevalence of physical activity by 25% it may be possible to avert 1.3 million deaths annually (Beagelhole et al., 2011). Thus prevention of the onset of NCDs has become a high priority in many countries.

Furthermore, non-communicable diseases have a negative impact on the global economy and have been identified as one of the major threats to economic development by the World Economic Forum (https://www.weforum.org/projects/dialogue-series-on-ncds). The reduction in economic growth is estimated at 0.5% for every 10% increase in NCD-related mortality [4]. Worksites and companies are directly affected by NCDs due to reduced employee productivity, increased absenteeism and increased likelihood of disability [2].

India, being a low to middle income high growth economy, is now on a road to high economic progress. However, our country is also experiencing a high prevalence of NCDs. In

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spite of having a national surveillance program to monitor the NCD risk factors, much greater volume of initiatives is needed to combat the burden of NCDs affecting health and threatening the well-being of people.

In this connection workplace NCD intervention programs are considered and expected to be very effective in reducing the NCD risk factors (Rocca, Beckman, Ekvall Hansson, & Ohlsson, 2015; Carnehon, 2009).

Why Workplace as Venue for Intervention. Workplace: A Priority Setting for Health Promotion

The workplace, along with the school, hospital, city, and marketplace, has been established as one of the priority settings for health promotion and prevention of NCD risk factors into the 21st century. (http://www.who.int/occupational_health/publications/healthy_workplaces_background_documentdfinal.pdf).

The workplace, along with educational institutes, health-care organizations, city, etc., directly impact the physical, mental, economic and social well-being of employees, their families and associated communities. In the workplace we have an ideal setting and infrastructure to administer and monitor the promotion of health and NCD prevention for a large audience. (Workplace health promotion http://www.who.int/occupational_health/topics/workplace/en)

The policy of promoting healthcare in the workplace (HPW) is becoming increasingly popular among the private and public organizations, which recognize that future success in a globalized world can only be achieved with a healthy, qualified and motivated workforce. In administering HPW, the organizations can ensure a strategic balance between customer expectations, company targets, employee's capabilities and healthcare needs, which can assist organizations to compete in the marketplace. For many nations, the development of HPW will go side by side with development.

(http://www.who.int/occupational_health/topics/workplace/en/index2.htmlainable social and economic development).

Benefits for Workplace Health Promotion

Ensuring proper healthcare to workers' health and safety has extensive benefits, such as:

- If workers are keeping good heath, they are productive and raise healthy families; thus healthy workers are a key strategy, i.e. goal, for overcoming poverty.
- The workplace can be made healthier because workplace health risks are higher in the informal sector and small industry which are key arenas of action on poverty alleviation, where people can work their way out of poverty;
- It has been observed that safe workplaces contribute to sustainable development, which is the key to poverty reduction;
- From organizational perspective the processes of protecting workers, surrounding communities and the environment for future generations have important common elements, such as pollution control and exposure reduction;
- Often pollution and many environmental exposures that are hazardous to health arise from industrial processes, that may be influenced by occupational health and safety programmes;
- Occupational safety and health can contribute to improving the employability of workers, through workplace (re)design, maintenance of a healthy and safe work environment, training and retraining, assessment of work demands, medical diagnosis, health screening and assessment of functional capacities;
- Occupational health is the basis to public health, because it is clear that major diseases (e.g. AIDS, heart disease) need workplace programmes as part of the disease control strategy.

Table 1: Enumerating the Benefits of Workforce Health Promotion

To the organization	To the employee
a well-managed health and safety program	a safe and healthy work environment
a positive and caring image	enhanced self-esteem
improved staff morale	reduced stress
reduced staff turnover	improved morale
reduced absenteeism	increased job satisfaction
increased productivity	increased skills for health protection
reduced health care/insurance costs	improved health
reduced risk of fines and litigation	improved sense of well-being

These benefits are greater for low-paid workers in high risk occupations and settings, and in this way occupational health interventions can reduce inequities. Efforts made by WHO and its partners to strengthen key aspects of occupational health focus on increasing the coverage of workers in under-served countries and regions with basic occupational health services.

(http://www.who.int/occupational_health/publications/healthy_workplaces_background_documentdfinal.pdf).

Behavioral Risk Factors: (1) tobacco use, (2) unhealthy diet, (3) physical inactivity and (4) harmful use of alcohol.

The worldwide threat of non-communicable diseases constitutes a major public health challenge that undermines social and economic development throughout the world. We need strong leadership and urgent action at regional and national levels to mitigate them, which again has the effect of increasing inequalities between countries and within populations.

2. An estimated 36 million deaths, or 63% of the 57 million deaths that occurred globally in 2008, were due to non-communicable diseases, comprising mainly cardiovascular diseases (48% of non-communicable diseases), cancers (21%), chronic respiratory diseases (12%) and diabetes (3.5%). 1,2 These major non-communicable diseases share four behavioral risk factors: (1) tobacco use, (2) unhealthy diet, (3) physical inactivity and (4) harmful use of alcohol.

According to WHO's projections, the total annual number of deaths from non-communicable diseases will increase to 55 million by 2030, if proper mitigation steps are not taken. All the same, non-communicable disease burden can be greatly reduced if cost-effective preventive and curative actions and interventions for prevention and control of non-communicable diseases are implemented in an effective and balanced manner. (http://www.who.int/occupational_health/publications/healthy_workplaces_background_documentdfinal.pdf).

As requested by the World Health Assembly in resolution WHA64.11, the Secretariat has developed a global action plan for the prevention and control of non-communicable diseases for the period 2013–2020.

There are some other conditions of public health that are closely associated with the four major non-communicable diseases. These include: (i) other non-communicable diseases (renal, endocrine, neurological, hematological, gastroenterological, hepatic, musculoskeletal, skin and oral diseases, and genetic disorders); (ii) mental disorders; (iii) disabilities, including blindness and deafness; and (iv) violence and injuries

Other Modifiable Risk Factors

Four main shared risk factors – tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol – are the most important in the sphere of non-communicable diseases.

In addition, exposure to environmental and occupational hazards, such as indoor and outdoor air pollution, may cause chronic respiratory disease and some air pollution sources. Fumes from solid fuels may cause lung cancer and indoor and outdoor air pollution, heat waves and chronic stress related to work and unemployment are also associated with cardiovascular diseases. Simple, affordable interventions to reduce environmental and occupational health risks are available, and prioritization and implementation of these interventions can contribute to reducing the burden due to non-communicable diseases (Health Assembly resolutions WHA49.12 on WHO global strategy for occupational health for all, WHA58.22 on cancer prevention and control, WHA60.26 on workers' health – global plan of action, and WHA61.19 on climate change and health).

Mental Disorders

Mental disorders can be important causes of morbidity and contribute to the global burden of non-communicable diseases, and thus equitable access to effective programmes and health care interventions for mental dis orders is needed. Mental disorders affect, and are affected by, other non-communicable diseases: they can be a cause or effect of a non-communicable disease, or the result of interactive effects. For example, there is evidence that depression predisposes people to heart attacks and, conversely, heart attacks increase the likelihood of depression. Risk factors of non-communicable diseases such as sedentary behavior and harmful use of alcohol also link non-communicable diseases with mental disorders. Close connections with characteristics of economically underprivileged population segments such as lower educational level, lower socioeconomic status, stress and unemployment are shared by mental disorders and non-communicable diseases. All the same, evidence indicates that mental disorders in patients with non-communicable diseases are often overlooked. Thus in organizations, comprehensive mental health action plan also needs to be implemented in close coordination with the action plan for the prevention and control of regular non-communicable diseases, at all levels.

In the Workplace health promotion focuses on a number of factors that may not be sufficiently covered in the legislation and practice of occupational health programmes. These factors can be the organizational environment, the promotion

of healthy lifestyles, and non-occupational factors in the general environment. Non-occupational factors include family welfare, home and commuting conditions, and community factors which affect workers' health.

Workplace health promotion should support a participatory process to help promote a stronger implementation of tools for maintaining or strengthening a national healthy workplace initiative, such as an awards system as an incentive for participating enterprises, and creation of healthy workplace networks. To be effective, workplace health promotion has to involve the participation of employees, management and other stakeholders in the implementation of jointly agreed initiatives and should help employers and employees at all levels to increase control over and improve their health.

Some health promotion activities in the workplace may focus on a single illness or risk factor (e.g. prevention of heart disease) or on changing personal health practices and behaviors (e.g. smoking, diet). However a more effective strategy should consider multiple determinants of workers' health. A health-promoting workplace recognizes that a healthy workforce is essential and integrates policies, systems and practices conducive to health at all levels of the organization. Thus, workforce health promotion is an ongoing process for improving work and health. Experience in workplace health promotion has shown that competitions and awards are valuable in engaging enterprises in occupational health and safety activities. Firms and enterprises achieve valuable publicity and a boost in staff morale through competing to become the most healthy and caring company.

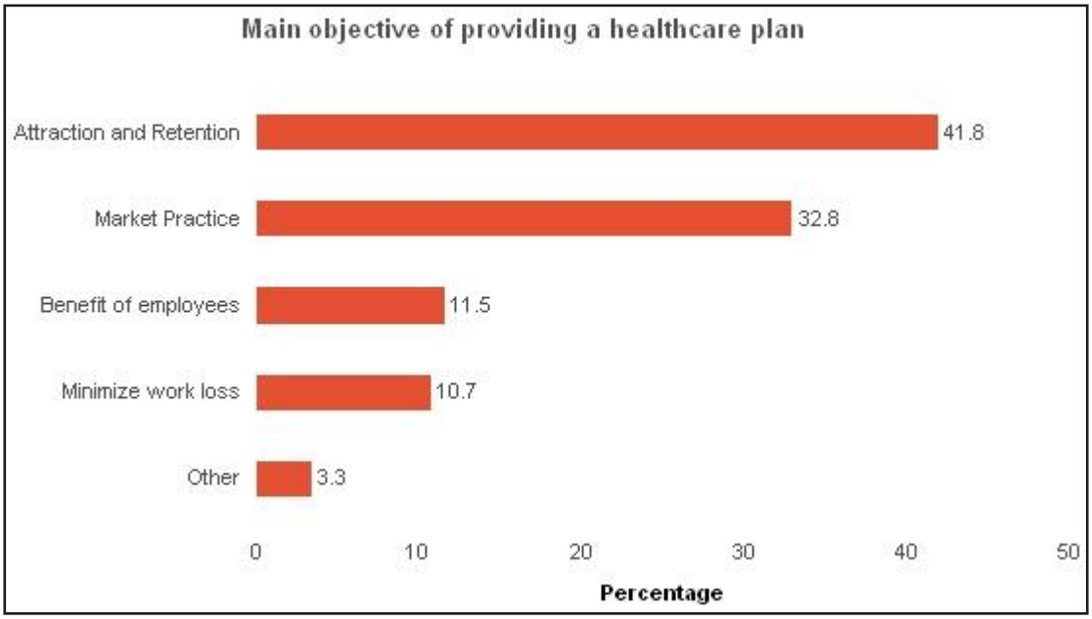
http://www.who.int/occupational_health/topics/workplace/en/index1.html.

Health-Care Benefits to Employees in India

In India, healthcare benefits form an essential part of the benefits package provided to employees by organizational employers. A Towers Watson benefits trends survey, published in mid-2009, reported that almost 46 percent of employers in Asia believe that health is the benefit to which their employees attach the greatest importance. https://www.towerswatson.com/en-IN/Insights/IC-Types/Survey-Research-Results/2010/04/Healthcare-Benefits-in-India.

CURRENT HEALTH-CARE PROVISIONS

Indian companies have often realized the need to closely evaluate their talent management policies to ensure they can attract and retain key talent. In a survey(Towers Wilson, 2009), a majority of the surveyed companies report the use of their health care plans as a talent management tool. This clearly substantiates the view that 'healthcare benefits' are strategically viewed as an 'employment value differentiator. It is equally important that such benefits are relevant and adaptive to changing market conditions.



Source: Purchasing value in Health Care Survey 2009, Towers Watson, https://www.towerswatson.com/en-IN/Insights/IC-Types/Survey-Research-Results/2010/04/Healthcare-Benefits-in-India.

Fig. 1: Objective of Providing Health Care Plan

Given the benefits of company initiatives to address the challenge of NCDs, there are multiple approaches adopted by companies to implement them. One specific approach for this is provided below.

Healthcare initiatives to address NCDs in Indian workplaces… case of a non-profit organization

Let us consider the case of a Non-profit organization dedicated to reduce/minimize the spread n NCDs in organizations in India. This organization leverages strong science, medical and non-medical expertise, public-private partnerships and modern technology to make a measurable impact on public health. Recognizing the challenges of NCDs in India, the organization has set up an award system amongst Indian companies, assessing the company initiatives to help prevent employees from falling victim to NCDs.

The initiatives thus assessed fall into five categories, which are assessed with a questionnaire comprising:

- Leadership
- Health Trends & Productivity
- Workplace NCD Prevention Program
- Mental Health Program
- Community NCD Prevention Program

LEADERSHIP

Leadership comprises the responsibility for decision making in an organization or unit within an organization and the qualities that result in its success. Senior leadership involvement and commitment to workplace health promotion programs and well being initiatives contribute significantly to the probability that employees will participate in these programs. Given the significant impact that senior leadership has on the success of a company's health and wellness program, a best practice is having a leader not only professionally qualified to lead workplace health promotion efforts – but also well integrated into the culture and mission of the business.

In examining this aspect of corporate commitment to health and wellbeing, the Healthy Workplaces Platinum Award questionnaire sought to identify the individuals the organization has placed in this role: their qualifications, the authority the leader(s) have to drive change, and the evidence that this person or persons has indeed exercised true leadership. In addition, this questionnaire looked for evidence that health and wellness was well integrated into each organization's overall business strategy. So essential is leadership in driving highly effective health and wellness programs that leadership is the most heavily weighted of the five criteria.

Health Trends and Productivity

In today's competitive market, it is a competitive advantage for employers to take a holistic approach to assessing and mitigating health risks in their workforce. More than two decades of research clearly show the importance of health and productivity as a business strategy. (1) Healthier workers have lower healthcare costs, are more likely to have higher job performance, are absent less often due to illness, and are usually more engaged. Just as importantly, healthier workers are more productive. Since estimated lost productivity costs are more than twice those of direct healthcare costs, (2)) and companies who implement evidence-based workplace health promotion practices perform better financially, the advantages of striving to improve health and wellness are significant.

WORKPLACE NCD PROGRAM OF THE COMPANY

In this phase the following aspects of the criteria were measured and analyzed.

- Initiatives to ensure a healthy work environment are in place and having significant impact on worker well-being.
- Initiatives to ensure Lifestyle and behavior change programs to address and reduce NCD risk factors and behaviors
- Programs to improve health awareness**.**

MENTAL HEALTH PROGRAMS

Mental health disorders have a substantial impact not only on the health of individuals and communities, but also pose an economic challenge to companies in terms of lost productivity and a diminished workforce.

A strong inverse relationship exists between employee job satisfaction and measures of mental health such as stress, burnout, anxiety, and depression.. Faragher, E. (2005). The relationship between job satisfaction and health: a meta-analysis. *Occupational and Environmental Medicine*, *62*(2),105–112. http://dx.doi.org/10.1136/oem.2002.006734

Research in the U.S. has consistently shown that the indirect costs from mental health issues to the employer is approximately three times greater than the related direct costs of absenteeism and medical care -- combined. In India, where the medical costs of treating mental health disorders for employers is typically lower than in the U.S., the ratio of indirect costs to direct costs of mental health issues may be even higher. Indirect costs can be attributed to diminished work performance. The ensuing loss in productivity from

affected employees' inability to work at their full capacity – an effect known as "presenteeism " is substantial. So significant are the human capital and financial costs of mental health issues, that employers worldwide have consistently identified stress as the number one issue influencing their health and wellness programs until just this past year; although it is still remains within the top three. Buck Consultants. (2009, 2010, 2014). *Working Well: A Global Survey of Health, Workplace Wellness and Productivity Strategies. www. Bucksurveys. com*

Xerox Corporation. (2016). *Working Well: A Global Survey of Workforce Wellbeing Strategies. www.bucksurveys.com*

COMMUNITY NCD PROGRAMS

An initiative that is fully aligned with the company's vision, mission, CSR and sustainability goals; one that has a well-defined vision, set of goals, a shared strategic plan, articulated metrics, and established internal and external benchmarks that latter of which are tied to World Health Organization NCD healthy diet targets.

A program assessment process that includes an objective third-party community satisfaction survey tool that is validated for both literate and illiterate program participants and that is conducted by an academic institution using scientific methodology.

A pilot health impact study of one of a company's Community NCD Reduction Programs, with the goal of disseminating the process to all of its community outreach programs, once completed.

The above five components of Healthy Workplace Initiatives are implemented in Indian companies and the extent of implementation of these phases are assessed and measured by the Healthy Workplaces questionnaire. This measurement initiative falls in line with the old adage that "what gets measured, gets improved". Thus with the help of the questionnaire A total metrics of Indicators are considered comprising the effort which goes into the initiatives (the Input Indicators) and the desired outcome obtained, (the output indicators).

Usefulness of Metrics in Strategic Organizational Initiatives

The usefulness of metrics for measuring performance of any strategic initiative has long been recognized in operating processes of organizations. Metrics are able to establish the implementation framework of organizational strategic initiative and enhance the understanding that value could be created (Melnyk, Stewart, & Swink, 2004). Though the creation of metrics has been a challenge in theory and practice, once developed, companies can effectively use this to measure their performance and can identify gaps between the actual performance and what needs to be achieved. Metrics often help to indicate the priorities and goals of organizations in the initiative they are pursuing. They help to indicate the gap between where the organization is and where it wants to be. They also indicate mismatches between organizations, their customers and their activities. While studying the use of metrics in organizations, a source of complexity has often been encountered in the heterogeneity of methods used for developing the metrics. Some metrics examine relationships between managerial practices such as quality improvement approaches and business performance (Evans, 2004). Some bring out a strategic fit between human resource strategies and say productivity. (Skinner, 1969). There are others that also explore different strategic fits between operations strategy, financial strategy and the competitive business environment (Wheelwright, 1984). In this paper it is our objective to present metrics for measuring healthcare initiatives for employees in the area of NCDs, in an organization and link the system to the improvement of health and well-being and thereby prevent the onset of NCDs.

The Input Indicators for Healthy Workplace Questionnaire

Leadership Indicators

- Strategic focus of health and wellness
- Senior leadership support for health and wellness
- Communication of health and wellness focus and programs
- Staffing for health and wellness focus and programs
- Health and Wellness Budget
- Health and Wellness Costs
- Etc.

Health and Productivity Trends Indicators

- Health Assessments and Biometric Screening
- HRA, (Health Risk Assessment), Biometric Screening, and Health Check Participation Data.
- Health Behaviors: Tobacco Use (example: Report percent of smokers/tobacco users who successfully quit for one year)
- Health Behaviors: Alcohol Use and exercise (example : percentage of employees who consume alcohol regularly for two years, percentage of workforce who exercise regularly for 2 years etc.)

Health Behaviors: Overweight/Obese and Stress

Nutrition : Cafeteria Choices

Etc.

Workforce NCD Prevention Program Indicators

Program Budget and Costs

Program Incentives and Costs

Program Participation and Completion Data

Program Participation and Outcomes

Etc.

Mental Health Program Indicators

Program Budget and Costs

Program Incentives and Costs

Program Participation and Completion Data

Program Participation and Outcomes

Community NCD Program Indicators

Program Budget and Costs

Program Incentives and Costs

Program Participation and Completion Data

Use of program data and metrics

The Output Indicators

Annual *number who completed a health risk assessment**
Annual *number who completed biometric screening**
Annual *number who received an annual health check**
Total blood cholesterol(cases of Dyslipidemia)
Systolic blood pressure hypertension
Blood sugar (cases diabetes)
Percentage of employees who smoke/use tobacco
Percentage of employees who exercise regularly (for example 3-5 times per week)
Percentage of employees enrolled in your exercise facility
Percentage of employees who are overweight or obese

Note: The above list of Input Indicators and Output Indicators is not complete and exhaustive yet but comprises a few essential ones to be used in the study.

The Research Question

In this research the objective would be to explore the linkages between the Input Indicators and the Output Indicators. In order to carry out this research the following conceptual framework was used, to be validated empirically.

Data Collection :

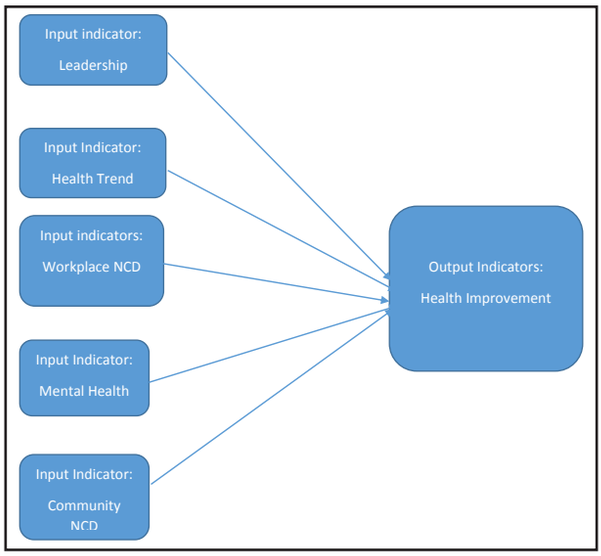


Fig. 2

With the help of the Healthy workplace questionnaire data was collected for 12 world class companies, operating in India, which led to the computation of all Input indicators and output indicators.

Thus the sample size was n=12 indicating the results to be only indicatory.

DATA ANALYSIS

Driving Forces

The driving forces which motivated the companies to take up the healthy workplace initiative:

top reasons	percentage of companies
Improved employee productivity	100
Improved employee morale/engagement	91.66667
Improved overall employee health	91.66667
Reduced absences due to sickness or disability	25
Improve employee loyalty	25
Improved organizational image	25
Enhanced attraction and retention of employees	16.66667
External recognition (such as awards and best places to work lists)	16.66667
Reduced health care costs	8.333333

Thus the top 3 reasons were the motivation for Healthy Workplace Initiative were (a) Improved employee productivity (100 % companies mentioned this reason) (b) Improved employee morale/engagement

(91.67 % companies mentioned this reason as one of the top 3 reasons) and (c) Improved overall employee health

(91.67 % companies mentioned this reason as one of the top 3 reasons).

Exploring the Linkages Between Input Indicators and Output Indicators

The Input Indicators, Leadership, Health Trend, Workplace NCD, Mental Health and Community NCD, were consolidated to obtain performance scores for different companies.

The score was actually a weighted average using weights designed by the system as:

Performance Scores for Healthy workplace Initiative obtained upon taking weighted average:

Weights :
Leadership = 110/300
Health Trends= 70/ 300
Workplace= 60/300
Mental Health =30/300
Community NCD= 30/300

		Leadership	Health trend	Workplace	MentalH	Community	Performance score for Healthy Workplace initiative
	points	110	70	60	30	30	300
	weights	0.366667	0.23333	0.2	0.1	0.1	1
1	Company A	95.45	86.79	75	76.5	83.83	86.28233333
2	Company B	99.09	97.14	93	75.83	100	95.182
3	Company C	100	95.71	98.33	97.5	100	98.415
4	Company D	97.73	87.14	86.67	73.33	77.33	88.567
5	Company E	100	93.21	75.83	86.67	79.17	90.16566667
6	Company F	94.55	72.64	92.33	86	68.33	85.51666667
7	Company G	95.45	96.79	97.5	95	93.33	95.91566667
8	Company H	89.5	94.29	86.67	84.17	82.5	88.81866667
9	Company I	95	88.57	71.5	64.83	90	85.28266667
10	Company J	99.09	84.64	87.5	65.83	61.67	86.33233333
11	Company K	82.95	86.86	100	55	61.67	82.34933333
12	Company L	97.27	56.79	65	72.5	58.33	80
	Average score	95.50667	86.71417	85.7775	77.7633	79.68	88.56894444

Graphically the average scores are depicted as:

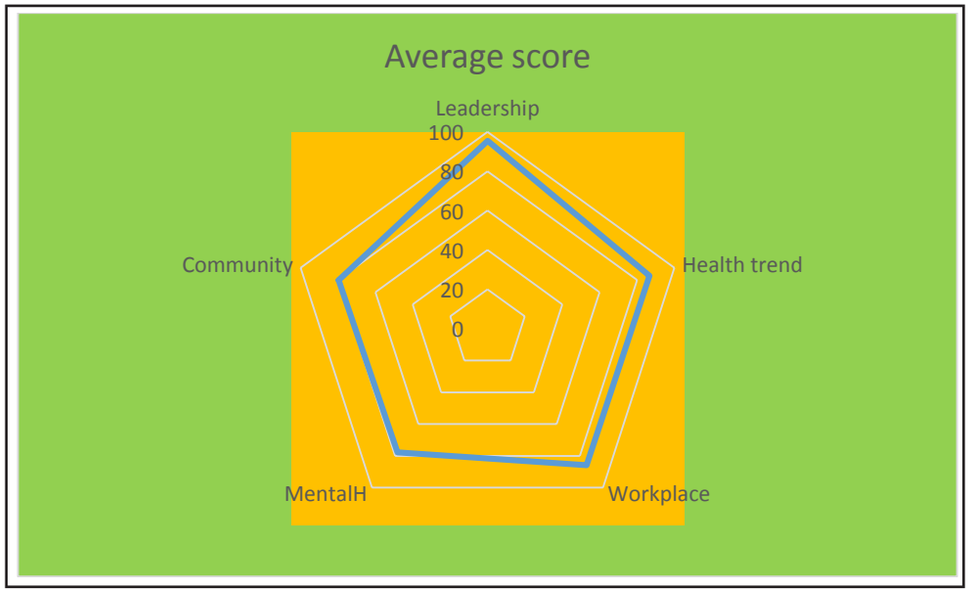


Fig. 3

In the data analysis the above table served as Input Indicators. For the output indicators, the 10 output Indicators were classified into :

(a) HRA etc. Annual number who completed a health risk assessment, biometric screening and received health check.

(b) Cholesterol, hypertension, sugar:

Total cases having blood cholesterol (cases of Dyslipidemia),

Systolic blood pressure hypertension, and blood sugar (diabetes)

(c) percent of employees who smoke and/or overweight.

To explore the linkages between the Input Indicators and Output Indicators, a series of runs using Regression Analysis were carried out with following results.

Results on Regression Analysis

Four runs were conducted using Multiple Regression Analysis with following results.

Run 1: **Dependent variable: Percent of employees who smoke and are obese**.

Independent Variables: Leadership, Health Trend, Workplace NCD, Mental Health and Community NCD.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.917[a]	.840	.441	.19721

a. Predictors: (Constant), communityncd, leadership, workplncd, mentalhealth, healthtrend

Coefficients[a]						
Model B		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		Std. Error	**Beta**			
1	(Constant)	9.319	2.994		3.113	.090
	leadership	-.024	.015	-.507	-1.627	.245
	healthtrend	-.120	.039	-2.167	-3.065	.092
	workplncd	.008	.010	.284	.765	.524
	mentalhealth	.018	.011	.871	1.728	.226
	communityncd	.021	.010	1.060	2.079	.173

a. Dependent Variable: smokeobese

The only variable having significant impact (-.120) on Percent of employees who smoke and are obese is :

Health trend (level of significance = .092). Please note that the coefficient is negative, as expected, because enhancing Health Trend Initiative should decrease the percent of employees who smoke and/or are obese.

Thus, from the results above it emerges that data shows as Health trend initiative is high it actually and significantly decreases the percent of employees who smoke and/or are obese.

Run 2: **Dependent variable: number of cases of employees who have cholesterol, hypertension and diabetes.**

Independent Variables: Leadership, Health Trend, Workplace NCD, Mental Health and Community NCD.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.786[a]	.618	-.337	.10086

a. Predictors: (Constant), communityncd, leadership, workplncd, mentalhealth, healthtrend

Coefficients[a]						
Model B		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		Std. Error	**Beta**			
1	(Constant)	-.510	1.531		-.333	.771
	leadership	.009	.008	.562	1.166	.364
	healthtrend	-.010	.020	-.574	-.525	.652
	workplncd	.001	.005	.143	.250	.826
	mentalhealth	.001	.005	.148	.189	.867
	communityncd	.005	.005	.683	.866	.478

a. Dependent Variable: cholhypdiab

However, none of the variables are significant in this case.

Run 3: Dependent variable: Annual number of employees who completed health risk assessment, biometric screening and health check.

Independent Variables : Leadership, Health Trend, Workplace NCD, Mental Health and Community NCD.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.898a	.806	.563	.20044

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	
1	Regression	.667	5	.133	3.319	.134b
	Residual	.161	4	.040		
	Total	.827	9			

Coefficientsa						
Model	**Unstandardized Coefficients**	**Standardized Coefficients**	**t**	**Sig.**		
	B	Std. Error	Beta			
1	(Constant)	2.989	1.437		2.080	.106
	leadership	-.003	.014	-.049	-.209	.844
	healthtrend	-.006	.014	-.146	-.426	.692
	workplncd	.032	.009	1.000	3.539	.024
	mentalhealth	.007	.008	.251	.863	.437
	communityncd	.002	.008	.089	.257	.810

The only significant variable here is Workplace NCD. This implies that data supports the hypothesis that workplace NCD Initiatives significantly increases Annual number of employees who completed health risk assessment, biometric screening and health check.

Run 4: Dependent variable: percent of people who exercise regularly.

Independent variables: Leadership, Health Trend, Workplace NCD, Mental Health and Community NCD.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.995a	.990	.937	.16756

a. Predictors: (Constant), communityncd, leadership, workplncd, mentalhealth, healthtrend

Coefficientsa						
Model	**Unstandardized Coefficients**	**Standardized Coefficients**	**t**	**Sig.**		
	B	Std. Error	Beta			
1	(Constant)	-26.141	7.367		-3.549	.175
	leadership	.052	.020	.459	2.679	.227
	healthtrend	.393	.089	2.748	4.434	.141
	workplncd	-.016	.011	-.234	-1.387	.398
	mentalhealth	-.149	.031	-2.955	-4.833	.130
	communityncd	-.013	.009	-.244	-1.377	.400

a. Dependent variable: exercise

In this run none of the independent variables emerged as having significant impact (at 5 or 10 % level of significance) on percent of people who exercise regularly.

However Health trend Initiative is significant at 14 % level of significance.

DISCUSSION OF REGRESSION RESULTS

In all the four Regression runs the coefficient of Determination was high. All the same the significance of F-statistic, in the

ANOVA was > . 05. This implied that these results were statistically not acceptable at 5 % level of significance.

In the Run1, level of significance for F statistic was 0.353.

In Run2, level of significance for F statistic was 0.700.

In Run3, it is 13.4 %

In Run4, it is 17.3 %.

Thus considering the F-significance of the Regression runs, Run3 and Run4 may be acceptable at 14 % and 17 % level of significance, which are the best results in this analysis.

SUMMARIZING THE RESULTS IT EMERGES

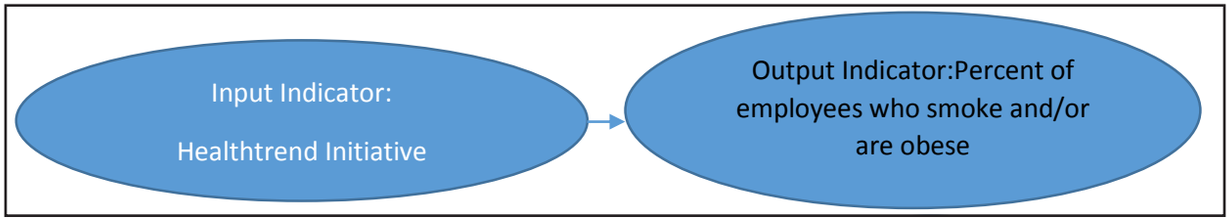


Fig. 4

Healthtrend initiative has significant impact (negative coefficient) on percent of employees who smoke and/or are obese. Thus it actually and significantly decreases the percent of employees who smoke and/or are obese. Significant at 9.2 % level of significance.

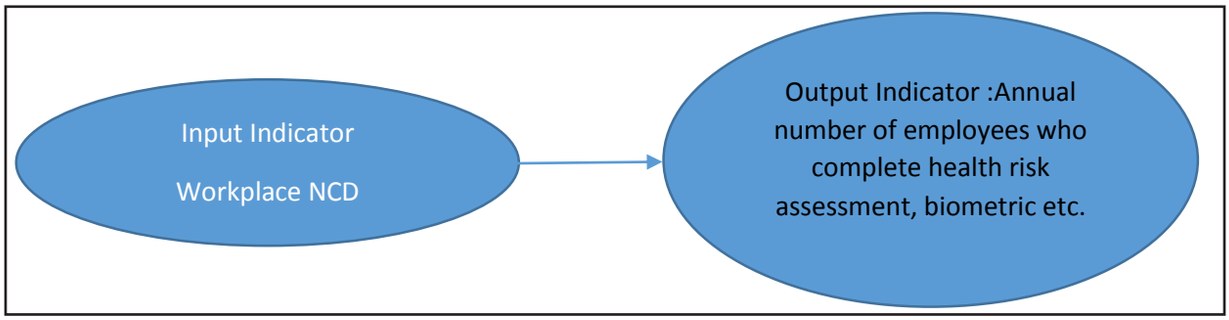


Fig. 5

Workplace NCD Initiatives significantly increases Annual number of employees who completed health risk assessment, biometric screening and health check.

Health trend Initiative has significant impact on percent of employees who exercise regularly, significant at 14 % level of significance.

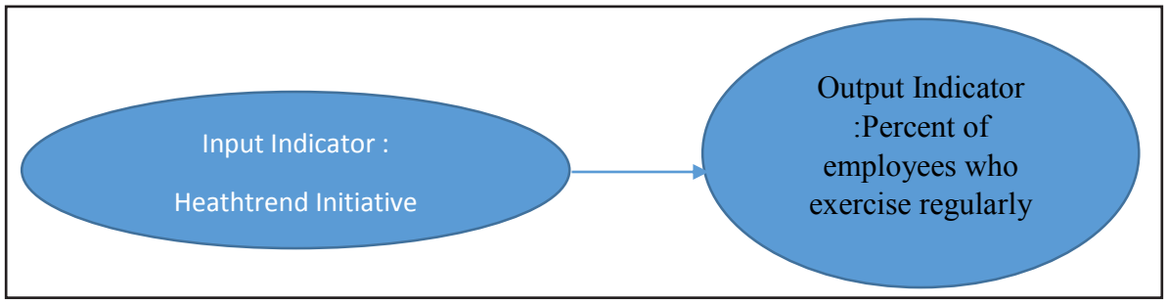


Fig. 6

In addition to Regression trend analysis was also conducted comparing the levels of output indicators over 2016 and 2017. The following results emerged which indicated there was substantial improvement in them.

Results on Trend Analysis Observed on Output Indicators

Out of a total workforce of 212677 employees, 17269 completed the health risk assessment annually (8.12 % increase). In one case it had gone up to 39 %.

* Out of a total workforce of 212677 employees, 15214 completed biometric screening (7.15 % increase). In one case it had gone up to 67 %.

* Out of a total workforce of 212677 employees, 19824 received an annual health check, (9.32% increase). In one case it had gone up to 67 %.

* Cases of Dyslipidemia (total blood cholesterol) went down in 4726 cases (2.22 % decrease). In one case it had gone down to 8 % decrease.

* Systolic blood pressure hypertension went down in 2973 cases (1.34 % decrease). In one case it had gone down to 9 % decrease.

* Employees who smoke tobacco went down in 34859 cases (16.4 % decrease). In one case it had gone down to 50 % decrease.

* Employees who exercise regularly (for example 3-5 times per week) went up in 91513 cases, (43.02 % increase). In one case it had gone up to 67 % increase.

* employees enrolled in company exercise facility went up in 54840 cases (25.79 % increase). In one case it had gone up to 100 % increase.

DISCUSSION ON TREND ANALYSIS

The results obtained in this phase emerged very encouraging. There were substantial increases in the workforce who completed heath risk assessment, annual health check and biometric screening.

Cases of Dyslipidemia (total blood cholesterol) , Systolic blood pressure hypertension went down and Employees who smoke tobacco also went down.

Employees who exercise regularly and are enrolled in the company exercise facility went up.

Hence data supported the impact of input indicators on output indicators on health and well-being of employees. In fact all the major health behavior factors associated with non-communicable diseases, got addressed.

LIMITATIONS

The study this year considered a rather small sample of 12 organization. All the same the results came to very encouraging conclusion. In the years to come, as sample size will grow, one would expect a much more statistically significant conclusion will emerge.

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