PHYSICAL INACTIVITY AS A FACTOR AFFECTING QUALITY OF LIFE (QOL) IN PEOPLE WITH NON COMMUNICABLE DISEASE (NCD): A DESCRIPTIVE CROSS - SECTIONAL ASSESSMENT

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ABSTRACT

Background: Physical inactivity is one of the biggest threats not only to the developed countries but the middle and low income countries, are equally affected. However, many developed countries have prepared strategies for promotion of physical activity. This is not the scenario of the developing countries where they are struggling to stabiles with basic public health parameters. As a result of no concern from the governments they face huge risk of NCDs. This study was carried out in India in the "coal capital" Dhanbad district situated in Jharkhand.

Aims & Objective: The first objective of the research is to find out the level of physical inactivity in people NCD and secondly, to find out how physical inactivity affects their Quality of Life (QOL).

Material and Methods: The research is based on descriptive cross-sectional study. Data collection from patients with NCDs is done by 2 Set of standard questionnaire (GPAQ and WHO- QOL questionnaire) on level of physical activity assessment and QOL assessment and another set of questionnaire for demographic and research related information. Total sample size is 365, out of which 192 was from household survey and 173 were based on hospital based data collection.

Results: Results show high level of physical inactivity (72%) in people with NCDs. Findings reveal that 72.1% of people are physically inactive. It shows that the physical activities acts as a controlling factor for NCD and have a significant relationship with QOL.

Conclusion: The research helps us to conclude that low physical inactivity would lead to low QOL in people with NCDs.

Key-Words: Non Communicable Diseases (NCDs); Quality of Life (QOL); Physical Inactivity; National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS)

Introduction

Non communicable diseases or NCDs are defined as diseases or conditions that occur in, or are known to affect, individuals over an extensive period of time and for which there are no known causative agents that are transmitted from one affected individual to another.[1] For the purpose of this study we are considering 5 NCDs - cardiovascular diseases, diabetes, hypertension stroke and oseto-arthritis. Commonly known risk factors for these include lack of exercise, improper diet and smoking.[2]

Physical inactivity is one of the biggest threats to the middle and high income countries, which has increased their burden of diseases, due to demographic transition, change in life style, and change in various aspects of personal and social life.[3] The alarming high rise of physical inactivity has not only brought together the countries to come up for an effective solution to address this issue at the UN high level meet 2011 but has also made countries to frame suitable policies and to act on it.[4] In spite of the global alarm on the issue, the government of India has just a few programs to address the issue of decreasing physical inactivity which makes it a severe threat to the community.[5,6] India has a lot of inequities and a very small portion of the GDP is spent on health.[7,8] The cost implications of NCDs to society are enormous and run into thousands of crores of rupees that include direct costs to people with illness, their families and indirect costs to society, due to reduced productivity.[9]

Policies are driven by suitable evidence and in spite of global evidence that an investment in addressing the modifiable determinant (raised blood pressure, cholesterol, tobacco use, unhealthy diet, physical inactivity, alcohol consumption, and obesity) would be one of the most cost effective ways to address the menace due to NCDs enough emphasis is not placed on them.[10] Still for majority of the states achieving their targets of improving the basic health indicators (IMR, MMR, Immunization, family planning, water and sanitation) remains a big issue to be addressed.[11,12] Physical inactivity, has still not started to be assessed in the National Health Surveys.[13-15]

Cardiovascular disease, cancer, chronic lung diseases and diabetes – are the four major NCDs that kill three in five people worldwide, and cause great socioeconomic harm within all countries, particularly developing nations.[16] India has over 1.2 billion population and there is high prevalence of risk factors for NCDs.[17] Physical activity is considered as an important behavior that helps to prevent millions of premature deaths and unwanted burden on the country and the family. The country is experiencing a rapid health transition with a rising burden of NCD's which are emerging as the leading cause of death in India accounting for over 42% of all deaths with considerable loss in potentially productive years (aged 35-64 years) of life.[18] According to a WHO report (2002), cardiovascular diseases (CVDs) will be the largest cause of death and disability in India by 2020.[19]

As government is least concerned about the issue of the decreasing physical inactivity and there is no information on physical inactivity in Dhanbad this study focuses to find the level of physical inactivity and to develop some recommendations for promoting physical activity. This study has two objectives, first to assess the level of Physical inactivity in people with NCDs and second is to find out how does it affects their QOL.[20]

Materials and Methods

The sample size calculation was made on the basis of reference study conducted by Nawi Ng and Mohammad Hakimi, et al; to determine the prevalence of physical inactivity in nine rural INDEPTH Health and Demographic Surveillance Systems in five Asian countries.[21] They found that the prevalence of physical inactivity amongst men in India is 52 % and in women it is 54%. Taking reference of the prevalence from this study where p = 52% at 90% level of confidence limit. Based on this prevalence sample size was derived as 369.2308 and with 10% of over sampling the sample size was determined as n = 406. For the Sample collection, multi-stage random sampling technique was adopted. The data collection was determined to collect 203 samples from the patients visiting the different hospitals and same quantity from the household based samples.

Dhanbad is a district in Jharkhand with a population of 26,82,662 (2011 census) with literacy rate of 74.94% and having average household size of 5.57.[22] The city is known for being the coal city of India. The major economy to the city comes from Bharat coaking coal limited (BCCL) and a majority of the people in the city are employees of BCCL.[23] The city has major health care coverage by BCCL central hospital, Bhuli Hospital, Patliputra Medical College Hospital(PMCH), Pragati nursing home, Patliputra nursing home, IKON, Railway hospital, Asharfi Hospital, Jalan Hospital, Namdhari Hospital.[24] Among these hospitals the majority of the patients visit Central hospital, Pragati Nursing home and the District hospital (which shares its space with the PMCH). These hospitals are in the private and government domain, and a major contributor to the healthcare is by BCCL. Selection of hospitals was done by firstly based on their domain of service (Government hospital, BCCL and Private hospital) and then selection of 3-hospital by the random sampling method one each from the 3 domain. Simultaneously, Household Sample was obtained from Bhuli by the multistage random sampling i.e. Selection of blocks, then sectors and finally quarter numbers.[25]

Bhuli is one of the largest residential areas for workers in India. Individual selection was determined by if they were above 18 years old and if they had NCDs (Diabetes, hypertension, cardiovascular diseases, osteo-arthritis and stroke). A total of 180 persons were interviewed from hospitals, who are visiting the study centers during the duration of data collection after they had taken the physician appointment. A review of their prescription was done and was inquired from them if they would be interested towards contributing towards the research for next 15 minutes. Based on their consent, recruitment of individuals was done. The questionnaires were translated in Hindi by experts; it was back tested and field tested before implementation. Some questions where people where not comfortable or did not want to answer was left.

Data collection was made by two standardized tools (WHO Quality of Life (Bref) questionnaire (WHO QoL) and Global Physical Activity Questionnaire (GPAQ) which has been standar-dized and validated in India and also a questionnaire which was developed to capture the demographic and general activity information.[26,27] Information on –type of disease, duration of illness, who has recommended him/her for exercise, if they were performing exercises than and if they follow the recommendation, has the disease affected their activity for daily living, family or work participation, or community participation. While data collection it was observed that many people are not aware what would come under exercise- so they were inquired if they were performing- morning walk, yoga, exercises, jogging,

sports, cycling or any other exercise activity. They were also asked if they were regularly performing exercise and the duration of exercise. Whereas in the WHO QOL (Bref) questionnaire, there was a question about, their satisfaction from sexual life, which was not being asked to respondents who were single or above 50 years, as this is a very sensitive issue so the same was not inquired from many females too. It was only asked from people who are married to people who are up to 45 years.

To ensure the ethical issues; the researcher obtained approval from the ethical committee, SRM School of Public Health and verbal consent was obtained from the respondents after making them informed about the objective and purpose of study, all assured of anonymity, confidentiality and their ability to withdraw from the interview at any time.

The data analysis was done by Epi info software. The data of 380individuals was entered in the software, after the data cleaning there was 365 samples left, in which 173 were from the Hospital based data and 192 where household based. This research assesses how physical inactivity is related to their QOL in people with NCD.

Results

To verify if the data is evenly distributed Man-Whitney U test was conducted. Mann-Whitney U statistics was done in the demographic profiles such as scores obtained by GPAQ, gender, education, occupation, NCD, exercise performance, marital status, duration of illness and income distributions don't have any considerable significance between the patients visiting hospital and sample from the household table 1. But, the age profile and current illness showed significance which shows that the people from the hospital samples are in the range above forties.

From the data on Quality of Life domains and the total scores were compiled as per instruction of WHO – QOL – Bref guidelines. Total scores were classified as low, moderate and high with quartiles (q1 ≤ 22, q3 ≥ 25); which provides that 48.2% of the study population led a good quality life. Likewise, GPAQ classification also made using the guidelines. The study findings alarmingly indicate 72.1% of people are physically inactive in the study population.

In the table 2, Chi – Square statistics was tested to determine the association for the GPAQ classification with the socio – demographic profiles, where it was seen

that the aged people fall in the category of low level physical activity. Similarly the variables like male, married, school level & illiterates, retired & govt. sector people, more year of illness, non – performance of physical exercises and high earning people are physically inactive. The current illness doesn't have any impact on the physical activeness. There is a significant association between the QOL scores and the GPAQ classification (χ^2 = 143.657***).

From the Table 3, it shows 24.7% people were of low physical activity and thus had poor QOL. People with moderate (88%) and high physical activity had higher QOL. For the mediation analysis the QOL is considered as a dependent variable for the NCDs (independent) and physical activity as a mediation variable. The relationship between the QOL and NCD was highly significant (r = -0.36**) which indicates that the number of NCD will reduce the quality of life. Also, the relationship between the QOL and GPAQ has high significance (r = 0.16**) which indicates that as there is a direct relationship between the increase in physical inactivity and the QOL.

The physical activity and NCD doesn't have a significant (r = 0.05) relationship. This is due to the fact that the physical inactivity acts as a controlling factor for NCDs and has a significant partial relationship with QOL; it indicates that the physical activity will increases the QOL of the people with NCD. Fig: 1 shows the conceptual frame of the mediation analysis which fits very perfectly. The model of the fit (R^2 = 0.15) is QOL = - 0.36*NCD + 0.16*GPAQ; RMSEA < 0.05 ensures the goodness of fit gives the clear evidence that the increment in the physical activity of NCD's have impact in their quality of life.

By the application of mediation modelling we have selected NCD and physical activity (PA) as an independent variable(IV) and dependent variable (DV) as QOL and PA (table 4) The table indicates that with the increment in the number of NCDs the QOL of people will decrease (-0.349). An increase in the physical activity will also increase the QOL (0.146). When the physical activity is kept as control, it shows a partial correlation (0.385) the NCD and QOL. Structural equation (QOL = 0.165*PA - 0.357*NCD) shows in what way the QOL is related to NCD through the Physical activity. As the result of the RMSEA value falls under 0.05 it is an indicative of the right fit of the model which is described in the above diagram (Figure 1).

Table-1: Demographic Profile				
Parameters		**Hospital**	**Household**	**p-value#**
GPAQ Classification	Low	71.4 (62.5, 80.3)	72.8 (64.1, 81.5)	0.716
	Moderate	19.5 (11.7, 27.3)	21.1 (13.1, 29.1)	
	High	09.0 (03.4, 14.6)	06.1 (01.4, 10.8)	
Age	20 – 40	06.0 (01.3, 10.7)	23.1 (14.8, 31.4)	0.042
	40 – 60	71.4 (62.5, 80.3)	53.1 (43.3, 62.9)	
	60 – 80	21.8 (13.7, 29.9)	23.1 (14.8, 31.4)	
	Greater than 80	00.8 (-0.9, 02.5)	00.7 (-0.9, 02.3)	
Gender	Male	75.2 (66.7, 83.7)	64.6 (55.2, 74.0)	0.068
	Female	24.8 (16.3, 33.3)	35.4 (26.0, 44.8)	
Education	School Level	46.6 (36.8, 56.4)	51.0 (41.2, 60.8)	0.301
	Diploma	05.3 (00.9, 09.7)	01.4 (-0.9, 03.7)	
	UG	15.8 (08.7, 22.9)	23.8 (15.5, 32.1)	
	Prof. Degree	03.0 (-0.3, 06.3)	02.0 (-0.7, 04.7)	
	PG	00.0 (00.0, 00.0)	00.7 (-0.9, 02.3)	
	Illiterate	29.3 (20.4, 38.2)	21.1 (13.1, 29.1)	
Occupation	Retired	09.8 (04.0, 15.6)	08.8 (03.2, 14.4)	0.121
	House-Wife	27.8 (19.0, 36.6)	40.1 (30.5, 49.7)	
	Private	18.8 (11.1, 26.5)	17.0 (09.6, 24.4)	
	Shop-Keeper	00.0 (00.0, 00.0)	01.4 (-0.9, 03.7)	
	BCCL	39.8 (30.2, 49.4)	27.2 (18.5, 35.9)	
	Govt	03.8 (00.1, 07.5)	02.7 (-0.5, 5.9)	
	Other	00.0 (00.0, 00.0)	02.7 (-0.5, 5.9)	
Currently Ill	Yes	58.6 (48.9, 68.3)	38.1 (28.6, 47.6)	0.001
	No	41.4 (31.7, 51.1)	61.9 (52.4, 71.4)	
Non-Communicable Disease	Any One	66.2 (56.9, 75.5)	66.7 (57.5, 75.9)	0.921
	Any Two	29.3 (20.4, 38.2)	24.5 (16.1, 32.9)	
	Any Three	03.8 (00.1, 7.5)	06.8 (01.9, 11.7)	
	Any Four	00.0 (00.0, 00.0)	00.7 (-0.9, 02.3)	
	All	00.8 (-0.9, 02.5)	01.4 (-0.9, 03.7)	
Performing Exercise	Yes	66.2 (56.9, 75.5)	53.1 (43.3, 62.9)	0.079
	No	33.8 (24.5, 43.1)	46.9 (37.1, 56.7)	
Marital Status	Single	03.0 (-0.3, 06.3)	04.8 (00.6, 09.0)	0.546
	Married	97 (93.7, 100.3)	95.2 (91.0, 99.4)	
Duration of Illness	< Six Month	06.0 (01.3, 10.7)	00.7 (-0.9, 02.3)	0.057
	Last One yr	06.8	09.5	

Table-1: Demographic Profile				
Parameters		**Hospital**	**Household**	**p-value#**
		(01.9, 11.7)	(03.8, 15.2)	
	One to Two yrs	03.8 (00.1, 07.5)	08.8 (03.2, 14.4)	
	Two to Five yrs	27.8 (19.0, 36.6)	39.5 (29.9, 49.1)	
	Five to Ten yrs	42.1 (32.4, 51.8)	33.3 (24.1, 42.5)	
	Ten to Fifteen yrs	09.0 (03.4, 14.6)	04.1 (00.2, 08.0)	
	> Fifteen yrs	04.5 (00.4, 08.6)	04.1 (00.2, 08.0)	
Salary	Less than 10000	29.3 (20.4, 38.2)	25.9 (17.3, 34.5)	0.243
	10000 – 20000	16.5 (09.2, 23.8)	23.1 (14.8, 31.4)	
	20000 – 30000	20.3 (12.4, 28.2)	28.6 (19.7, 37.5)	
	30000 – 40000	21.1 (13.1, 29.1)	20.4 (12.5, 28.3)	
	40000 – 50000	09.8 (04.0, 15.6)	01.4 (-0.9, 03.7)	
	Above 50000	03.0 (-0.3, 06.3)	00.7 (-0.9, 02.3)	

P value using Mann-Whitney U test; * Significance at the level of 0.05; ** Significance at the level of 0.01

Table-2: GPAQ Classification						
Parameters	**Profile**	**Low**	**Moderate**	**High**	**Total**	**Sig**
Age	20-40	30	18	7	55	0.001**
	40-60	160	44	21	225	
	60-80	70	12	0	82	
	> 80	3	0	0	3	
Marital Status	Single	7	7	1	15	0.041*
	Married	256	68	26	350	
Gender	Male	176	61	17	254	0.021
	Female	88	13	10	111	
Education	School Level	116	51	12	179	0.004**
	Diploma	7	4	1	12	
	UG	54	10	9	73	
	Prof. Degree	8	1	0	9	
	PG	1	0	0	1	
	Illiterate	78	8	5	91	
Occupation	Retired	31	3	0	34	0.119
	Housewife	79	34	12	125	
	Private	47	14	4	65	
	Shopkeeper	3	0	0	3	
	BCCL	89	23	9	121	
	Govt.	10	0	1	11	
	Others	4	0	2	6	
Currently Ill	Yes	131	34	10	175	0.436
	No	133	40	17	190	
Duration of Illness	< 6 months	6	3	3	12	0.006
	Last one Year	22	7	1	30	
	One to 2 Year	11	7	5	23	
	2 to 5 Years	88	23	12	124	
	5 to 10 Years	107	25	5	137	
	10-15 Years	19	4	0	23	
	>15 Years	9	7	0	16	
Performing Exercise	Yes	163	39	14	216	0.255
	No	99	35	13	149	
Salary	< 10000	65	33	3	101	0.001**
	10000-20000	47	12	13	73	
	20000-30000	73	10	7	90	
	30000-40000	59	13	4	76	
	40000-50000	14	4	1	19	
	Above 50000	5	1	0	6	
Total		263	74	28	365	

* Significance at the level of 0.05; **Significance at the level of 0.01

Table-3: Mediation Analysis

Parameters	Adj. R²	Beta	P
Regression[QOL] on [NCD]	0.119	-0.349	0.000 **
Regression [PA] on [NCD]	0.000	0.052	0.318
Regression [QOL] on [PA] controlling for [NCD]	0.144	0.165	0.001**
Beta for [NCD]		-0.357	

* Significance at the level of 0.05; **Significance at the level of 0.01

Table-4: Mediation Modelling Table

Step	IV	DV	r	Std. β	R²	Sig.
1	NCD	QOL	-0.349**	-0.349	0.122	<0.01
2	PA	QOL	0.146**	0.146	0.021	<0.01
3	NCD	PA	0.052	0.052	0.003	>0.05
4	PA / NCD	QOL	0.385**	0.165 / -0.357	0.149	<0.01

* Significance at the level of 0.05; **Significance at the level of 0.01

Table-5: GPAQ Classification Vs Quality of Life Score

Parameters		Quality of Life Score						Sig.
		21	22	23	24	25	26	
GPAQ Classification	Low	0	3	1	1	207	51	
	Moderate	1	0	0	0	46	27	0.043
	High	0	0	0	0	21	7	
Total		1	3	1	1	274	85	365
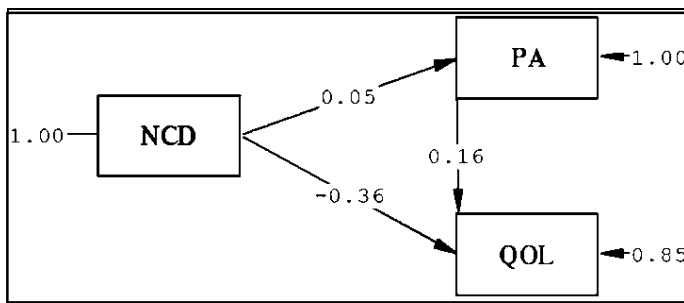
Figure-1: Mediation Modelling

Discussion

The GPAQ shows high correlation between level of physical activity, age (0.001) and salary (0.001) of the person with NCD. This means that the younger the age the people are more physically active and as ageing progresses their level of activity decreases.

A difference in perception about their health, when asked are they currently ill, is seen because of their different perception. There is difference in perception of individuals, who are ill versus who (174) are not ill (190). This is because of the fact that those who are having the new emergence of the disease did not find any difference in their health, people who had controlled NCDs also felt that they are not ill, people who were performing high level of activity also had the perception that they are not ill. Whereas those who had the chronic illness and had less physical activity perceived that they are ill. It is seen that there is a relation between the individual salary and their level of physical inactivity.

On applying the mediation model on the NCDs and QOL

we see a 0.82 relation between the two, whereas when it is applied to the NCDs and physical activity it is 0.88 and when physical activity is seen in relation of QOL it is found to have a 0.79. This indicates that there exist a relation between the physical activity and QOL and increase in the physical activity would lead to better QOL of the people.

So far globally there's no single study that highlights the linkage between NCDs, physical activity and QOL. This uniquely highlights the importance of how physical inactivity is related to the poor QOL and vice-versa. Now it becomes more important for the clinicians, exercise physiologist as well as the public health professionals to think about how we can increase the level of physical activity in people with and without NCDs. At the same point of time it also opens many grey areas of research on the topic where there is a need to understand the behavioural aspects of physical inactivity/activity in people with NCDs, how to increase their adherence to the recommended physical activity protocol, what are the other areas apart from physical activity that would be affected by poor QOL, evidence based interventions for disease specific protocols to increase the QOL. Now it becomes more important for the public health policy makers to plan for the diverse group of people with varied needs and the alarming growing epidemic of physical inactivity. Physical inactivity is not just a phenomenon that is just prevalent in high income countries but it is equally becoming a big issue for the middle countries too.

While the studies from the western world has indicated a high prevalence of physical inactivity.[28-31] This has led towards designing better policies that helps to improve physical activities. So far there are only few researches available on this topic and most of the research indicates a prevalence of more than 52%, comparatively this study shows that there is a high level of Physical inactivity (72%) in the people of Dhanbad.

Presently, clinical services are not adequately equipped to provide the required level of care for these NCDs in primary and secondary health-care settings. Therefore, the appropriate strategies should be devised to be implemented under NPCDCS to ensure that the NCDs can be prevented and managed in an effective manner. Policies and plans for facilitation of physical activity levels at all work environment and community settings needs to be done. There is a need for the transplantation of the policies in the community.

The present study highlights the high level of physical inactivity (72 %) and would be a major threat to the population in Dhanbad but it may not be the same scenario of the entire state, other states or national scenario. There may be problem in the certain methodology or tool selection. As at the time of study there was no other Indian tool to assess the physical activity level. So the author decided to go along with the GPAQ, and WHO- QoL Bref as it is validated and in some of the earlier researches from India utilizes the tool.

Conclusion

This is the first study that shows how QOL largely affects physical activities and NCDs are related to the physical inactivity. Our findings suggest that the physical inactivity level is quite high in people of all age group and people with both the gender. There is a need to develop more programs with focus into the different age groups and also looking it though the gender lens, socio cultural factors and religious believe also needs to be taken into account. As this research establishes a close link between the improvement of physical activity and better QOL and vice-versa and there is a need for the government, policy makers, clinicians and policy makers and other stake holders to make suitable holistic policies to improve the level of physical activity. In addition to the above facts it also brings importance on the urgent need of a national research on the level of physical inactivity in the public health researches.

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