

Original Research Article

A study on physical activity in shift workers in an urban city of India

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ABSTRACT

Background: Physical inactivity has been identified as one of the leading risk factors for non-communicable diseases. Several studies have established the fact that shift working is associated with various non communicable diseases. Studies assessing the knowledge, attitude and practice towards physical activity amongst shift workers is almost non-existence even though it has been established that mediators like knowledge and attitude affect healthy behaviour and adoption of health improving behaviour. Thus this study aims to assess the knowledge-attitude-practice of physical activity among shift workers in Gurugram city which is the centre of various BPO/KPO companies in India.

Methods: The present study is an organization based cross sectional study. Interviewer administered questionnaire were used to capture information on physical activity. Information on knowledge and attitude was collected using a piloted and pretested questionnaire. Practice of physical activity was collected using global physical activity questionnaire (GPAQ). Descriptive and linear regression analyses were performed using Ms-Excel and STATA (13).

Results: Our study found that nearly fifty percent of the study participants were physically inactive and only 18% of the study participants knew recommended minimum weekly intensity of physical activity. Physical activity was found to be significantly associated with overall knowledge score ($p < 0.01$).

Conclusions: Knowledge regarding physical activity among the study participants was not adequate as reflected in their physical activity practice, hence knowledge and awareness towards physical activity should be enhanced to prevent non communicable diseases amongst the shift workers.

Keywords: Physical activity, Shift work, Knowledge, Attitude, Practice

INTRODUCTION

Non-communicable diseases have been established as a clear threat not only to human health but also to the growth and development of a nation. The impact is severe in low middle income countries as majority (82%) of premature deaths from non-communicable diseases occur in these countries.¹⁻³ Due to rapid urbanization and demographic transition in many low and middle income countries, lifestyle changes that promote unhealthy diet, substance abuse and sedentary behaviour have become common place.⁴ Amongst various risk factors, physical

inactivity, unhealthy diet, tobacco use and alcohol abuse have been listed as modifiable underlying causes of major non-communicable diseases by the World Health Organization (WHO).⁵

Further, nowadays organizations world over are extending their conventional working hours through the arrangement of shift working/rotator shift work in order to meet the constant demand and supply gap.⁶ Numerous studies have shown and it is now well accepted that long term participation in most shift work schedules is associated with health problems including non-

communicable diseases.^{7,8} The association between shift work and higher risk of non-communicable diseases like cardiovascular disease, obesity, diabetes/metabolic syndrome and various cancers and engaging in unhealthy lifestyle has also been demonstrated.⁹⁻¹⁹

Knowledge and awareness about non communicable diseases and their modifiable risk factors is an important component of population based preventive strategy. The World Health Organization's framework of stepwise approach for non-communicable disease risk factor surveillance does not provide any information about the knowledge, attitude and practice of modifiable risk factors of non-communicable diseases.²⁰ Among the modifiable risk factors leading to higher prevalence of non-communicable diseases, a large share can be attributed to physical inactivity.²¹ Undeniably the need to assess the knowledge, attitude and practices towards physical activity among shift workers cannot be undermined. But studies that explore the knowledge, attitude and practices around physical activity in shift workers in India are almost non-existent. Therefore our study aims to assess the knowledge, attitude and practice (KAP) of physical activity among shift workers located in Gurugram, the center of business process outsourcing companies.

METHODS

The study was designed as an organization based cross sectional study and was quantitative in nature. The study was conducted from December 2017 to March 2018, in Gurugram, Haryana, India.

Ethical considerations

Ethical approval for the study was taken from Institutional Ethics Committee (ECR/124/Inst/HR/2014). Written informed consent was obtained from each respondent and all identifiable information was kept confidential.

A total of 215 subjects were covered in this study. The primary consideration for determination of sample size of this study was resource-availability and feasibility of data collection. Also following the rule-of-thumb of sample size as described by Green et al wherein it is shown that a minimum of 200 subjects is sufficient for conducting regression analysis and the study of Hosseinzadeh et al on KAP of physical activity which recruited a sample of 200 respondents, we recruited a total of 215 subjects in the study.^{22,23} Following the method of Thorp et al respondents were recruited through snow balling and internal communication from different organizations around Gurugram.²⁴

Inclusion criteria were to include any adult employee engaged in shift work for at least one month who gave consent. Any pregnant employee and those who were not

medically fit or advised to avoid moderate to vigorous physical activity were excluded from the study.

The questionnaire used for the study comprised of five sections which captured general information, knowledge and attitude regarding non communicable disease and physical activity. Global physical activity questionnaire (GPAQ) was adopted to capture the practice of physical activity.²⁵ The questionnaire was piloted and pretested in a group of 30 shift employees in Ghaziabad, Uttar Pradesh.

Knowledge scores to assess the knowledge levels were generated for every respondent based on their answers with respect to non-communicable diseases and physical activity. Intensity of physical activity of each respondent was calculated using metabolic equivalents (METs) to find out the proportion of physically active and inactive or insufficiently active, based on the recommended 600 METs weekly activity level. METs are being used commonly to express the intensity of physical activity.

RESULTS

Results show that among the study respondents, 64% were male and 36% were female and the average age of shift workers was 28 years. Detailed demographic characteristics are provided in Table 1.

In terms of knowledge, 74% of the respondents had the knowledge that non communicable diseases are preventable. However, only 43% correctly identified all four modifiable risk factors for non-communicable diseases. Knowledge regarding physical activity revealed that 97% of the respondents knew that physical activity is beneficial, but only 18% were aware of the recommended weekly guideline of physical activity. The median knowledge score of the respondents was 15 (Table 2).

Assessment of attitude towards physical activity (A5) revealed that nearly 86% of the respondents disagreed that physical activity is expensive indicating a favorable attitude towards physical activity (Table 3).

In our study population, nearly 50% of respondents were physically inactive or insufficiently active with only six percent being moderately active at work (Table 4).

In terms of knowledge regarding physical activity between physically active and inactive groups, the mean knowledge scores were found to be significantly different ($p < 0.01$) between the two groups (Table 5).

Next we conducted linear regression analysis to identify the determinants of physical activity intensity (physically active and inactive/insufficiently active). The outcome variable of physical activity intensity (physically active and inactive/insufficiently active) was log transformed to meet the normality assumption. The independent variables which were put into the unadjusted model were

age, gender, education status, duration of shift work, residence, and living accompanies, overall knowledge score and attitude variables (A1-A5; details in Table 3). In the unadjusted analysis, gender and overall knowledge score were found statistically significant ($p < 0.01$ for both genders). Attitude variables A1 and A2 were also

significantly associated which signifies that physical activity was positively associated with those who disagree that physical activity takes time and those who disagree that physical activity is for overweight people only (Table 6).

Table 1: Demographic characteristics of study respondents.

Characteristics	Male (n=138)	Female (n=77)	Total (n= 215)
	Mean±SD	Mean±SD	Mean±SD
Age (in years)	29.1 (5)	27 (2.4)	28.1 (4.8)
Duration of shift working (in years)	3.6 (2.5)	2.7 (2.4)	3.3 (2.4)
Highest education			
Graduate	80 (58)	43 (56)	123 (57)
Post graduate	53 (38)	32 (42)	85 (40)
Others	5 (4)	2 (3)	7 (3)
Residing in			
Own house	28 (20)	14 (18)	42 (20)
Rented house	53 (38)	31 (40)	84 (39)
Paying guest/hostel	57 (41)	32 (42)	89 (41)
Living with			
Family	53 (38)	27 (35)	80 (37)
Alone	32 (23)	13 (17)	45 (21)
Friend/partner	53 (38)	37 (48)	90 (42)

Table 2: Distribution of respondents according to answers to non- communicable diseases and physical activity.

Knowledge statement	Response	Total (n=215)
		N (%)
A non-communicable disease is one that cannot spread between people	True	176 (82)
	False	16 (7)
	Don't know	23 (11)
Identify non communicable disease(s)	Heart disease	134 (62)
	Diabetes	121 (56)
	Cancer	136 (63)
	Stress	111 (52)
Do you think now a day's more and more people are suffering from non-communicable diseases	Yes	155 (72)
	No	14 (7)
	Don't know	47 (22)
Non communicable diseases are less dangerous than infectious diseases	Yes	75 (35)
	No	103 (48)
	Don't know	37 (17)
Do you think non-communicable diseases are preventable	Yes	159 (74)
	No	23 (11)
	Don't know	37 (17)
Do you think non-communicable diseases can lead to complications	Yes	163 (76)
	No	16 (7)
	Don't know	36 (16)
Do you think obesity is a risk factor for major non communicable diseases	Yes	148 (69)
	No	20 (9)
	Don't know	47 (22)
Identify the risk factors of non-communicable diseases	Smoking	163 (76)
	Alcohol abuse	147 (68)
	Low fruits and vegetables intake	110 (51)
	Physical inactivity	152 (71)
	All of the above	92 (43)

Continued.

Knowledge statement	Response	Total (n=215)
		N (%)
Do you think physical activity is beneficial to health?	Yes	209 (97)
	No/don't know	6 (3)
Do you think physical activity helps to prevent	Diabetes	163 (76)
	Heart disease	178 (83)
	Cancer	67 (31)
Physical activity helps to prevent stress	Yes	193 (90)
	No	8 (4)
	Don't know	14 (7)
Is recreational walking beneficial for health	Yes	182 (85)
	No	7 (3)
	Don't know	26 (10)
For adult what is the minimum weekly frequency of physical activity recommended for maintaining health	3 days weekly	57 (27)
	4 days weekly	59 (28)
	5 days weekly	78 (36)
	Don't know	21 (10)
Correctly mentioned the minimum weekly and daily frequency	Min 30 minutes daily for at least 5 days a week	39 (18)

Table 3: Distribution of respondents according to the responses to attitude statement by gender.

Variable	Attitude statement	Response	Male (n=138)	Female (n=77)	Total (n= 215)
			N (%)	N (%)	N (%)
A1	Physical activity takes too much time	Agree	43 (31)	23 (30)	66 (31)
		Disagree	95 (69)	54 (70)	149 (69)
A2	Physical activity is for those who are overweight	Agree	18 (13)	10 (13)	28 (13)
		Disagree	120 (87)	67(87)	187 (87)
A3	Physical activity is for those who are interested in sports/body building	Agree	17(12)	5 (6)	22 (10)
		Disagree	121 (88)	72 (94)	193(90)
A4	Physical activity is for adolescents; at my age physical activity does not improve my health	Agree	10 (7)	3(4)	13(6)
		Disagree	128 (93)	74 (96)	202(94)
A5	Being physically active is expensive(paying for gym/buying shoes/cloths etc)	Agree	20(14)	11(14)	31(14)
		Disagree	118 (86)	66 (86)	184(86)

Table 4: Distribution of responses of self-reported physical activity practice in various domains by gender.

Physical activity domains according to global physical activity questionnaire	Male (n=138)	Female (n=77)	Total (n=215)
	N (%)	N (%)	N (%)
Vigorous activity at work	Nil	Nil	Nil
Moderate activity at work	11 (8)	2 (3)	13 (6)
Activity during travelling to and from places	62 (45)	39 (51)	101 (47)
Vigorous recreational activity	46 (33)	9 (12)	55 (26)
Moderate recreational activity	52 (38)	35 (45)	87 (40)
Physically active	60 (43)	29 (38)	107 (50)
Physically inactive/ insufficiently active	78 (57)	48 (62)	108 (50)

Table 5: Difference in mean age and mean knowledge score between physically active and inactive group.

Variable	Active group	Inactive group	T statistics	Degree of freedom	P value
	Mean (SE) (95% CI)	Mean (SE) (95% CI)			
Age	28.7 (0.57) (27.5, 29.8)	28.0(0.34) (27.3, 28.7)	-1.0	213	0.31
Knowledge score	15.8 (0.38) (15.0, 16.5)	13.5 (0.47) (12.5, 14.4)	-3.8	213	<0.01

Table 6: Correlates of physical activity: unadjusted linear regression.

Variable	Crude coefficient		
	β coefficient	95% CI	P value
Age in years	0.002	-0.02, 0.02	0.83
Gender			
Female	Ref		0.003
Male	0.42	0.14, 0.70	
Highest education			
Graduate	Ref		0.66
Post graduate	-0.12	-0.41, 0.16	
Others	-0.16	-0.86, 0.52	
Duration of shift working	0.04	-0.01, 0.09	0.13
Residence			
Own house	Ref		0.18
Rented house	-0.10	-0.48, 0.27	
Paying guest/hostel	-0.31	-0.68, 0.05	
Living with			
Family	Ref		0.67
Alone	-0.16	-0.54, 0.21	
Friends/partners	-0.02	-0.34, 0.29	
Overall knowledge score	0.05	0.02, 0.08	0.00
Attitude A1			
Agree	Ref		0.03
Disagree	0.33	0.02, 0.65	
Attitude A2			
Agree	Ref		0.04
Disagree	0.41	0.01, 0.81	
Attitude A3			
Agree	Ref		0.74
Disagree	-0.07	-0.54, 0.39	
Attitude A4			
Agree	Ref		0.45
Disagree	0.21	-0.36, 0.79	
Attitude A5			
Agree	Ref		0.27
Disagree	0.21	-0.17, 0.61	

Table 7: Correlates of physical activity: result of adjusted linear regression analysis.

Variable	Adjusted β coefficient	95% CI	P value
Gender			
Female	Ref		0.002
Male	0.46	0.18, 0.74	
Overall knowledge score	0.05	0.02, 0.080	0.001
Attitude variable A1			
Agree	Ref		0.13
Disagree	0.23-0.07	0.54	
Attitude variable A2			
Agree	Ref		0.31
Disagree	0.20-0.19	0.59	

In the adjusted analysis, male gender showed positive association with physical activity when adjusted for other variables ($p < 0.01$). Overall knowledge score also showed

significant positive association with physical activity when adjusted for other factors ($p < 0.01$). However attitude variable A1 and A2 did not had any significant

association ($p>0.01$) with physical activity (Table 7). The adjusted model was also run for post estimation checks. The model showed normality of residuals, constant variance and no multi-co linearity of predictors.

DISCUSSION

Our study respondents were predominantly male with an average age of around 29 years, indicating young male population being engaged in shift work and with an average duration of shift work to be about 3.3 years. These findings of our study are very important considering that it is the younger population that is predominantly engaged in shift work and their KAP of non-communicable diseases and physical activity has hardly been assessed previously.

Keeping in view the objectives of this study, we found that even though nearly 82% ($n=176$) of the participants had the knowledge that non communicable disease cannot spread between people, only 34% ($n=74$) of the study participants were able to identify correctly all of the four major non communicable diseases. Further 43% ($n=92$) of the respondents could correctly identify all four major risk factors of non-communicable diseases. Considering that nearly 71% ($n=151$) of the respondents identified physical inactivity as a risk factor, we found that almost 50 % of the total study respondents were physically inactive. Our findings are in agreement with the report of Alsulami et al (2018).²⁶

Further near about 97% ($n=209$) of the respondents knew that physical activity is beneficial to health, but only 18% ($n=39$) were aware of the globally recommended weekly requirements of physical activity for adults. A previous analysis by Ramezkhani et al also observed similar findings in terms of physical activity knowledge.²⁷ This finding is very interesting considering that knowledge component of KAP is very important as a low knowledge score indicated poor awareness about risk from non-communicable diseases and physical inactivity.

The attitude regarding physical activity revealed that even though majority of the respondents disagreed that physical activity takes time, and more than half of them disagreed that physical activity is for obese people, only 49% ($n=107$) reported engagement in any physical activity during the time of study. With regards to physical activity practice, in the study sample nearly fifty percent of the total study participants were physically inactive which means they were not meeting the weekly recommended 600 metabolic equivalents and above.

Further our study also found that workplace related activity was very low, with only six percent ($n=13$) reporting to be moderately active at work. This could be attributable to work profile and timings in the shift schedule as it has been previously reported that shift work generally decreases the opportunities for physical activity and recreational activity.⁸ Also a significant

positive association was found between physical activity and male gender ($p<0.01$) when adjusted for other factors. Ramezkhani et al too reported similar higher physical activity among male respondents.²⁷ In a systematic review, Bauman et al also found male sex as a consistent correlates of physical activity among adults.²⁸ This is in concordance with various studies that reported gender differentials in terms of physical activity practice.

Our study also revealed a significant positive association ($p<0.001$) between physical activity and overall knowledge score. Adequate knowledge regarding the practice of physical activity can encourage people to be physically active as reported by Murad et al.²⁹ Parmaret et al reported that proper awareness campaigns can improve the knowledge which can ultimately lead to change the attitude for desirable behaviour change.³⁰

Our findings from this study have wide implications in terms of rising awareness about knowledge and practice in terms of risk factors for non- communicable diseases and physical activity among the young shift working population in India. A sedentary work profile along with low levels of knowledge of non-communicable diseases and importance of physically active lifestyle exposes the shift workers to various risk factors of chronic diseases. As previously reported by Peplonska et al, that the prevalence of risk factors like smoking is higher in shift workers than that of never or former shift workers; recreational inactivity was also found to be significantly associated with current shift workers than of never shift workers and our study also corroborates this fact among the Indian shift workers.¹⁹

Strengths and limitations

Convenience selections of organizations, use of snow balling to recruit respondents and not assessing the barriers to physical activity practice are some limitations of this study. Assessing the KAP of non-communicable diseases and physical activity among shift workers from business process outsourcing industry for the first time in an Indian city, inclusion of shift workers of various shift schedules and use of validated GPAQ tool for assessment of practice of physical activity are some key strengths of this study.

CONCLUSION

The shift workers were found to have knowledge of benefits of physical activity; but awareness regarding the minimum recommended guideline for adults was not adequate. This is reflected in the study population as high prevalence of physical inactivity/insufficient physical activity. Also significant positive association between male gender and physical activity practice was also seen, indicating that being male shift worker; one is likely to be more physically active than females. This finding also points towards future research to investigate the

correlates of physical activity among female shift workers.

The significant positive association found between level of knowledge and practice of physical activity, signifies that increasing the awareness among shift workers may lead to better practice of physical activity.

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