



EFFECTS OF WEARING FACE MASK ON PHYSICAL ACTIVITY IN MORNING WALKERS DURING THE PERIOD OF COVID-19 PANDEMIC – A PRELIMINARY STUDY.

Physiotherapy

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ABSTRACT

COVID-19 is a newly emerged pandemic disease which have been infecting lots of life around the world, with human to human transmission occurring through droplet spread. It is therefore made mandatory by government officials to use facemask in the public in a preventive measure to reduce the spread of this infectious disease. Our study tries to identify the effect of using facemask on the physical performance and activity in people who perform morning walk on a regular basis. The outcome measures used were Godin Leisure Time Exercise Questionnaire (GLTEQ), Satisfaction with Life Scale (SwLS), MRC Dyspnoea Scale, and Borg Scale of Perceived Exertion. Although participants felt an increased effort of breathing, there was no significant reduction in the physical activity of individuals as measured using GLTEQ. All other outcome measures showed a significant difference while compared to the instances where they did physical activity without mask.

KEYWORDS

Facemask, Morning Walkers, Physical Activity, Effort of Breathing, COVID-19.

INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. The term COVID is derived from the following; CO stands for Corona, VI for Virus, and D for disease. Coronavirus is a new virus linked to the same family of viruses as Severe Acute Respiratory Syndrome (SARS) and some types of common cold. It varies from other respiratory viruses in that it appears that human-to-human transmission occurs approximately 2 to 10 days prior to the individual becoming symptomatic.¹

The virus is transmitted from person to person through respiratory secretions. Large droplets from coughing, sneezing, or a runny nose land on surfaces within two meters of the infected person. Individuals with COVID-19 can present with an influenza like illness and respiratory tract infection demonstrating fever (89%), cough (68%), fatigue (38%), sputum production (34%) and/or shortness of breath (19%). The spectrum of disease severity ranges from an asymptomatic infection, mild upper respiratory tract illness, and severe viral pneumonia with respiratory failure and/or death. Current reports estimate that 80% of cases are asymptomatic or mild; 15% of cases are severe (infection requiring oxygen); and 5% are critical requiring ventilation and life support.²

A temporary lockdown has been imposed by governmental authorities all over the world due to the outbreak of pandemic COVID-19 in which people are required to stay in their homes and refrain from or limit activities outside the home involving public contact (such as dining out or attending large gatherings). Usage of face mask has been made mandatory within public in view of limiting the spread of infection. Individuals who refrain from wearing mask may attract penalty in India. Few studies have identified the ill effects of prolonged use of using face mask which includes a reduced oxygen intake, increased carbon dioxide content, increased shortness of breath, etc.^{3,4} This study was designed to identify whether using of mask causes any difficulty in people who regularly perform morning walk.

METHODS

The study adopted a convenient sampling technique and recruited subjects who were regular in morning walk as a routine exercise program in their day to-day life. Both male and female genders with an age limit of 30 and above were selected. Those who are performing the exercises within their local premises due to lockdown restrictions were also selected for the study. Those who have initiated routine morning walk under 1 year of duration were excluded. Informed consent was taken prior to any data collection procedure.

The demographic data and health related issues were documented in the predesigned data collection form. Subjects were asked whether they are regular in wearing mask and been using during their

physical activity. The issues faced by the subjects during the morning walk due to the use of mask were also documented. Four outcome measures were assessed to identify the effect of using mask quantitatively. Godin Leisure Time Exercise Questionnaire (GLTEQ), Satisfaction with Life Scale (SwLS), MRC Dyspnoea Scale and Borg Scale of Perceived Exertion were used. Participants were asked to score the outcome measures according to their subjective opinion upon using mask, as well as according to their opinion during the time they had performed activities without mask. GLTEQ assess self-reported leisure time activity of individuals under consideration. Godin have postulated an equation to identify the weekly leisure time activity score as “(9 x frequency of strenuous activity per week) + (5 x frequency of moderate activity per week) + (3 x frequency of mild activity per week)”.^{5,6} SwLS assess the satisfaction of an individual's life as a whole. It is found to be sensitive to changes in life satisfaction with appropriate interventions. The total score of SwLS ranges from 5 to 35, with a score between 31-35 considered to be extremely satisfied, 26-30 being satisfied, 21-25 being slightly satisfied, 20 being neutral, 15-19 being slightly dissatisfied, 10-14 being dissatisfied, and 5-9 being extremely dissatisfied.^{7,8}

MRC Dyspnoea Scale grades the effect of breathlessness on daily activities. Subjects were asked to grade their perceived breathlessness due to the use of mask during their morning walk.⁹ Borg Scale of Perceived Exertion was used to document the subjective rating of the intensity of exertion as perceived by the individual during morning walk, both with mask and without mask.¹⁰

Statistical Analysis

Data was analysed using IBM SPSS statistics version 20.0. Descriptive statistics was performed to explain the demographic details. Wilcoxon signed rank test was performed to identify the difference in the four outcome measures in consideration, between the instances while the individual use mask for morning walk and without mask.

RESULTS

Forty-seven adults between 30 to 79 years of age participated in the study with a mean age of 46.45 ± 12.37 . The mean height and weight of participants were 162 ± 12.77 and 63.63 ± 14.49 respectively. The mean BMI of the participants was 24.17 ± 4.57 . The mean duration of morning walk within the subjects was 70.47 ± 60.44 months, which ranged between 12 to 220 months. All participants acknowledged that they are using mask regularly as well as during morning walk. 30 out of 47 participants informed that they face difficulty in physical activity while wearing masks, with 29 people found an increased effort in breathing with the use of mask during morning walk (Figure 1).

There was no significant difference in GLTEQ scores during the weeks of morning walk with and without mask ($z = -0.368$, $p = 0.713$).

The mean score with mask was 23.89 ± 16.05 and without mask was 24.17 ± 15.44 . According to the definitions, participants were active without mask, and moderately active with masks. But the use of masks didn't affect the physical activity participation of the individuals. There was a significant reduction in life satisfaction measured using SwLS in participants when using mask ($z = -5.981$, $p < 0.000$). The SwLS scores during the period of not using mask was 30.17 ± 4.53 (satisfied) and scores during the period of mask usage was 24.34 ± 4.52 (slightly satisfied).

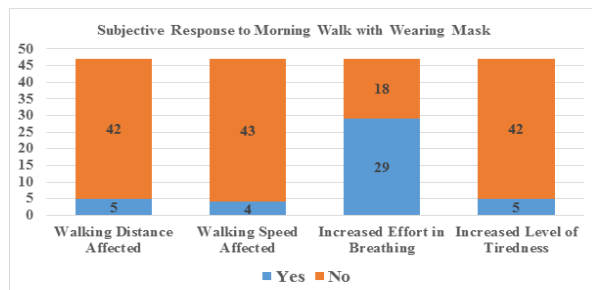


Figure1: Subjective Response To Morning Walk With Wearing Mask

MRC Dyspnoea Scale identified an increase in dyspnoea grades in 14 subjects with the use of mask while others didn't find any change. The Wilcoxon test identified this increase to be significant ($z = -3.372$, $p = 0.001$). 24 out of 47 subjects acknowledged an increase in perceived exertion during morning walk while using mask, which was statistically significant ($z = -4.304$, $p < 0.000$). 91.49% subjects felt no exertion in morning walk without mask, whereas 51.06% of them felt an increase in exertion, with 12.77% found exertion during morning walk to be somewhat hard or more (>13).

DISCUSSION

We observed that wearing a face mask during physical activity has an impact on the breathing and performance of the activity as such. Although participants found changes in other outcome measures, the level of physical activity was the same as they were performing during the instances without mask. This was analysed using GLTEQ. There was a reduction in satisfaction of life as assessed with SwLS. There was an increase in dyspnoea as well as an increased exertion during morning walk who participated in the study.

The systematic review of 84 articles conducted on 2012 over the impact of protective facemask on human thermoregulation discussed in regard to respiratory heat exchange mechanism, metabolic cost and thermal load, facial skin temperature changes, dead space and humidity, and psychosocial heat responses. The authors suggest that wearing a protective face mask may trigger a panic attack which can be amplified by the claustrophobic sensation and an increased facial skin temperature. This can in fact stimulate the flight and fight mechanism with an elevated heart rate, respiratory rate, palpitations, increased blood pressure, etc.¹¹ The study by Li Y et al also concluded that facemasks can induce significantly different temperatures and humidity which can lead to changes on heart rate, thermal stress and subjective perception of discomfort.¹²

Although there are studies which have identified the effect of face mask on physical activity using treadmill,^{12,13} there were no literatures which looked over its effects on the public who perform morning walk as their routine, and how the face mask challenges them. The lockdown regulations have forced the common people to wear facemasks to reduce the spread of infections which in turn have influenced their exertion and breathing levels as well as the performance of the physical activities.

CONCLUSION

We found that using mask during physical activity did not reduce the quantity of weekly activity on individuals as compared to the instances with no mask. But there was a significant reduction in life satisfaction and an increase in dyspnoea and perceived exertion grades while performing morning walk with mask. We suggest that individuals who participate in physical activities must isolate themselves from others during the workout period so that they can perform better without mask with avoiding the risk of getting

affected or spreading the disease. Individuals must also identify areas within their household premises so as to reduce contact with others within their locality and to find a safe area to perform exercises.

REFERENCES

- Bender L 2020, Key messages and actions for COVID-19 prevention and control in schools, UNICEF New York, accessed on 02 June 2020, <https://www.who.int/docs/default-source/coronaviruse/key-messages-and-actions-for-covid-19-prevention-and-control-in-schools-march-2020.pdf?sfvrsn=ba81d52_4>
- World Health Organization 2020, Coronavirus disease 2019 (COVID-19) situation report – 46, accessed on 02 June 2020, <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200306-sitrep-46-covid-19.pdf?sfvrsn=96b04adf4_>
- Kao TW, Huang KC, Huang YL, Tsai TJ, Hsieh BS, Wu MS. The physiological impact of wearing an N95 mask during hemodialysis as a precaution against SARS in patients with end-stage renal disease. *J Formos Med Assoc.* 2004; 103(8): 624-628.
- Roberge RJ, Coca A, Williams WJ, Powell JB, Palmiero AJ. Physiological impact of the N95 filtering facepiece respirator on healthcare workers. *Respir Care.* 2010; 55(5): 569-577.
- Godin G, Shephard RJ, A simple method to assess exercise behaviour in the community. *Can J Appl Sport Sci.* 1985; 10: 141-146.
- Godin G. The Godin-Shephard Leisure-Time Physical Activity Questionnaire. *Health & Fitness Journal of Canada.* 2011; 4(1): 18-22.
- Diener E, Emmons RA, Larsen R J, Griffin S. The Satisfaction with Life Scale. *Journal of Personality Assessment.* 1985; 49(1): 71-75.
- Pavot W, Diener Ed. Review of the satisfaction with life scale. *Psychological Assessment.* 1993; 5(2): 164-172.
- Bestall JC, Paul EA, Garrod R, Garnham R, Jones PW, Wedzicha JA. Usefulness of the medical research council (MRC) dyspnoea scale as a measure of disability in patients with chronic obstructive pulmonary disease. *Thorax.* 1999; 54: 581-586.
- Skinner JS, Hutsler R, Bergsteinova V, Buskirk ER. The validity and reliability of a rating scale of perceived exertion. *Medicine and Science in Sports.* 1973; 5(2): 94-96.
- Roberge RJ, Kim JH, Coca A. Protective facemask impact on human thermoregulation: an overview. *Ann Occup Hyg.* 2012; 56(1): 102-112.
- Li Y, Tokura H, Guo YP, Wong ASW, Wong T, Chung J, et al. Effects of wearing N95 and surgical facemask on heart rate, thermal stress and subjective sensations. *Int Arch Occup Environ Health.* 2005; 78: 501-509.
- Roberge RJ, Kim JH, Benson SM. Absence of consequential changes in physiological, thermal and subjective responses from wearing a surgical mask. *Respi Physiol Neurobiol.* 2012; 181: 29-35.