RESEARCH ARTICLE

The Lifestyle Habits and Well-being of Doctors through a Lens of Happiness Score on an Indian Dataset

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Abstract

Background: Our aim is to use the survey data to analyze how healthcare professionals evaluate their lifestyle habits and well-being. The novel concept of happiness score has been evaluated with respect to different factors.

Methods: A cross-sectional study was conducted for a period of 3 months. An assessment of lifestyle factors was done over the happiness score. Data were collected through the questionnaire method. The study period comprised between June 2021 and August 2021 with a sample size of 377. Health markers such as diabetes, hypertension, and lack of sleep were analyzed for different subgroups. We were also able to assess the dietary eating habit of doctors irrespective of the socio-demographic characteristics by random selection in different states. Generalized linear modeling was used to examine the association between the categorical variables and their respective happiness score.

Results: Our study has shown a positive association between lifestyle factors that affect the happiness score. It is truly highlighted with two major significant components such as dietary habits and profession have been plotted by using a violin plot against the happiness score value.

Conclusion: The aggregation of food components played a significant role in assessing the quality with respect to their lifestyle. There is no significant intake of alcohol and tobacco as recorded in the dataset. Happiness score value has been estimated which will help in forecasting the future happiness score for doctors depending on their lifestyle patterns.

Keywords: Categorical, Doctors, Happiness score, Health markers, Lifestyle, Violin plots.

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Introduction

Health is the most valuable asset of every individual. There is scientific evidence that being happy leaves a major good impact on our health.[1] Happiness is a positive state of mind which reflects the degree of contentment, joy, and satisfaction an individual possesses.

Health and happiness go hand in hand, and one needs to evaluate using lifestyle patterns. Assessment through lifestyle factors can help us to avoid adverse health outcomes and maximization of long-term health goals. In general, our healthcare professionals such as doctors and nurses must be in good health in order to perform their duties. They have to take care of the patients at any point in time. So, their jobs are more challenging and in this environment, their lifestyle is vulnerable.

The study period for our data collection coincides with the pandemic period COVID-19. The responses do get indirectly affected by the things going around simultaneously. The COVID-19 pandemic brought a lot of pain and suffering for mankind, but there was a brightness in dark times. The COVID-19 crisis places added stress and pressure on doctors.[2] For this inference, we aim to evaluate the lifestyle factors with respect to the happiness score. Some studies have shown a positive association of happiness among healthcare professionals.[3]

A minuscule section of research has looked upon a combination of lifestyle factors. Our study relates lifestyle factors to the happiness score for a group of healthcare professionals. This makes our study novel and unique in nature which focuses on the need for happiness factors in relation to lifestyle and dietary habits among doctors. Modifiable lifestyle factors such as alcohol consumption, tobacco, physical activity, body weight, diet quality, and lack of sleep affect the incidence of chronic diseases.[4,5] However, our study focuses not only on analyzing the occurrence of chronic diseases such as diabetes, and hypertension but also on the value evaluated under happiness score.

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Methodology

The data were collected through the questionnaire method. The study period comprised between June 2021 to August 2021 with a sample size of 377. Health markers such as diabetes, hypertension, and lack of sleep were analyzed for different subgroups. Our questionnaire comprised several components such as physical characteristics, such as age, gender, height, weight, number

of children, work profile, and profession; dietary information (vegetables, fruits whole grains, nuts, legumes, and pulses); lack of sleep due to obstructive apnea or due to profession; the presence of diabetes and hypertension; physical activity duration; alcohol and tobacco intake; consumption of other food items such as red meat, added sodium, trans-fat, fruit juice, refined sugar, long-chain fatty acid; family history; love for pets and playing a musical instrument as a hobby; occupation of mother and father; and "spouse financially independent."

Our questionnaire was distributed randomly through emails. Thus, a random sample of 377 doctors' responses was recorded. The age group was from 26 to 84 years of age. After the collection of data, a model was constructed to estimate the happiness score index and check its association with other variables in the model. Linear regression technique was used to check the association and significant difference among the variables by computing least square mean deviations. Thus, using the above statistics, we were able to estimate the happiness score based on the information recorded as per their lifestyle factors.

The happiness score has been labeled further into two categories. It assigns a value of 0 to those individuals whose score value lies in the range of 0–5. On the other hand, it assigns a value of 1 to those individuals whose score value lies in the range of 6–10. This classification was required on the outcome variable in order to perform estimable computations for modeling.

The statistical analysis was carried out in R programming language. The following cases were defined:

First, we wish to check if there was any association between the occurrence of diabetes and hypertension disease among the doctors due to family history. There is past evidence among the people who have been diagnosed with obesity, diabetes, hypertension has a positive association with the occurrence of cases in family history.[6] However, in the case of doctors, this association works differently. The model equation for this case is as follows:

$$FH = 0.7814 + 0.054\ \text{Diabetes} + 0.022\ \text{Hypertension} \quad (1)$$

The model equation [Eq. (1)] indicates coefficients for diabetes and hypertension. The following hypotheses of testing were established:

H_{01}: There is no significant association between family history on the occurrence of diabetes and hypertension.

H_{11}: There is a significant association between family history on the occurrence of diabetes and hypertension.

Since the *p*-value of this model (0.5029) is greater than α (= 0.05). We can accept H_{01} at a 5% level of significance. Thus, there is a majority number of cases of family history with "Yes" as the occurrence of the disease state. However, the variable has no significant impact on the occurrence of diseases such as diabetes and hypertension among the doctors' dataset in the present scenario.

Second, we aim to check if there was any association between lack of sleep due to profession (surgeon/physician) and gender. In this case, we aim to assess three factors together. The profession of an individual which could be either a surgeon/physician was causing a lack of sleep with respect to gender. The goodness-of-fit measure was 0.837. This implies that 83.7% of the variation in lack of sleep is caused by the profession. The hypothesis of testing is as follows:

H_{02}: There is no significant association of lack of sleep due to profession with respect to gender.

H_{12}: There is a significant association of lack of sleep due to profession with respect to gender.

$$LSP = 0.67 + 0.01\ P + 0.3\ \text{Sex} \quad (2)$$

The model equation [Eq. (2)] describes P as the "profession" and LSP as lack of sleep. However, the *p*-value of the model is less than α. So, we may accept H_{12} that there is a significant association with the profession which results in lack of sleep on the basis of gender.

Now, we need to assess various factors with the estimation of the happiness score. We aim to check how different factors are affecting the happiness score by modeling them in the following manner:

$$HS = 1.55 + 0.086\ \text{SFI} + 0.04\ \text{VFWGNLP} - 0.01\ \text{Alcohol} - 0.001\ \text{Tobacco} + 0.095\ \text{Physical activity} - 0.054\ \text{OSA} \quad (3)$$

In the model equation [Eq (3)], HS refers to the happiness score, SFI refers to "spouse financially independent," VFWGNLP stands for a dietary plan with a composition of vegetables, fruits, whole grains, nuts, legumes, and pulses, OSA is the obstructive sleep apnea. The hypothesis of testing:

H_{03}: There is no significant association of happiness score with the set of factors.

H_{13}: There is a significant association of happiness score with the set of factors.

Since the *p*-value (0.04) of the model is less than α, we may reject H_0 at a 5% level of significance. Thus, there is a significant impact of the variables such as "spouse financially independent," VFWGNLP, and physical activity has a positive impact on the happiness score. While variables such as alcohol, tobacco, and obstructive sleep apnea have a negative impact on the score value. The R^2 of the model is 83.2%. It means that 83.2% of the variation observed in the happiness score is explained well by the factors in the regression model.

Results

Our study includes a theoretical basis as well as statistical significance in order to show the relevance of factors in the lifestyle of doctors. The entire set of analyses had a level of significance at 5% and the analysis was carried out in R programming language.

Consider the first case where we aim to check the association between diabetes, hypertension, and family history. The analysis gives us a model with no significance. This association was studied in order to assess the relationship between the occurrence of diabetes and hypertension due to the presence of such cases in family history. Thus, from this sample of doctors, we can infer that there is no significant family history influence on their lifestyle.

From the second case, we aim to check if the profession of an individual which could be either a surgeon/physician was causing a lack of sleep, with respect to gender. The goodness of fit measure is 83.7% which is good enough for the justification of fitting our model. Under hypothesis testing, we conclude that the profession cause lack of sleep among doctors with respect to gender.

The third case gives a more detailed insight. Results from this case are also novel in nature due to the significant impact of all the above factors on the happiness score. Thus, factors that have marginal significance with the levels of physical activity ($p = 0.011$), dietary lifestyle ($p = 0.03$), sleep pattern ($p = 0.04$) associated with the profession, and the happiness score.

Figure 1 depicts the fitted and observed happiness score value for a sample of doctors. The predicted values obtained from model equation [Eq. (3)] are represented on *y*-axis while

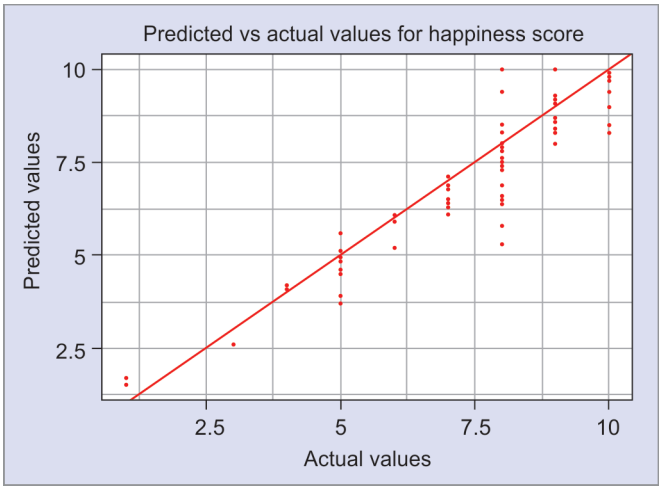

Fig. 1: Fitted vs observed happiness score value for doctors

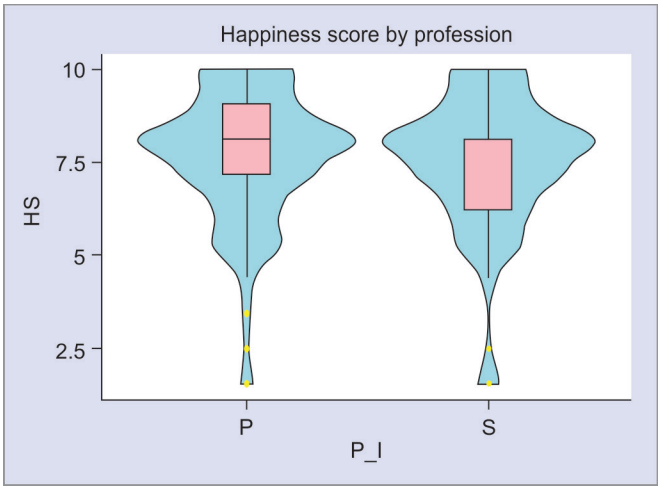

Fig. 2: Violin plot of happiness score by profession

observed values are plotted on *x*-axis. The estimated regression line is the diagonal line in the center of the plot. Because each data point is quite close to the projected regression line, we may conclude that the regression model fits the data reasonably well. Violin plots are used to have a better graphic representation of the dataset. It gives a combination of a box plot and kernel density plot. The wider section of the violin plot area indicates higher probability density and the thinner section shows lower probability in comparison.

Figure 2 displays the violin plot for happiness score on the *y*-axis and profession (physician for P and surgeon for S) is depicted on the *x*-axis. There are three outliers (yellow color) observed in profession by physician and two outliers in surgeon dataset. The box plot (pink color) depicts a slightly better representation of the interquartile range for physicians than surgeons.

Figure 3 depicts the dietary lifestyle followed by doctors in terms of aggregation of food components. Thus, majority of individuals with intake of this component has higher happiness score in terms of non-users. The interquartile range from the box plot also depicts a similar consumption result to the shape of the density plot.

However, the results of dietary lifestyle and physical activity are consistent with the previous studies which estimate the clustering effect. This effect is further on related to the lifestyle risk factors on life expectancy with chronic diseases.[7,8] The variables of alcohol ($p = 0.84$) and tobacco ($p = 0.97$) were coded as nominal outcome variables with no significant impact on the happiness score. The categorization was observed in order to observe the association of the above variables with other factors at different levels. The collection of data based on nutritional value acquired by an individual, from which we can infer a positive impact on their health and happiness score. Also, the method of aggregation stands self-sufficient in complementing their dietary habits.

Diet

The consumption of food should be nutrient centric leaving further a positive impact on health. In this questionnaire, the complete set of dietary food is inclusive of vegetables, fruits, nuts, whole grains, legumes and pulses, long-chain fatty acids, alcohol, refined sugar, fruit juice, red meat, added sodium to diet, tobacco, and trans-fat. All the food items were recorded as "Yes" with the intake and "No" with the absence of the item.

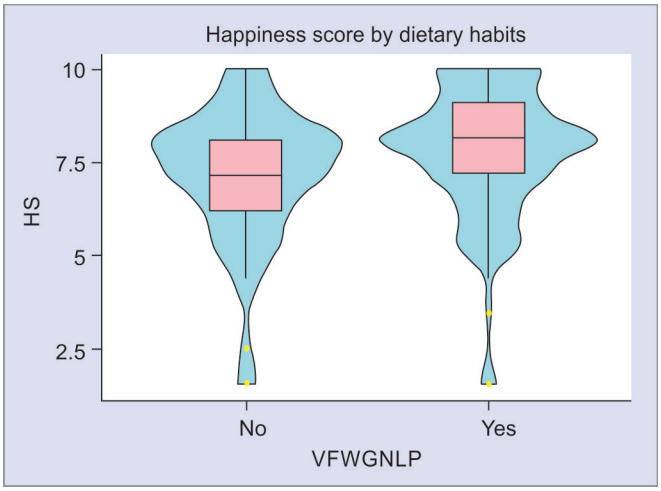

Fig. 3: Violin plot of happiness score by dietary habits

The principle of aggregation was used in analyzing this dietary component. While analyzing the data we had to place vegetables, fruits, nuts, whole grains, legumes, and pulses as "VFNWGLP" as another new variable. This new variable work as an intersection of all the above-mentioned food components. Instead of taking these components individually, we have considered them in estimation jointly. The other component like long-chain fatty acids, alcohol, refined sugar, fruit juice, red meat, added sodium to diet, tobacco, and trans-fat must be limited intake. The data goes in line with an avoidable intake of the above food items.

Alcohol

This variable was coded into four categories such as daily drinker, drinks on a weekly basis, and intake occasionally or never. From the summary statistics, the intake of alcohol was highest for the category of "never" followed by "occasionally" then "weekly" and very few on a "daily" basis.

Tobacco

The variable tobacco has been coded into three categories such as a smoker, chewer, and none. Summary statistics of this variable indicate that almost all the doctors except very few, a handful of them consume tobacco in their lifestyle routine.

Discussion

A study done in tertiary care medical college in Tamil Nadu, India indicates the prevalence of diabetes, hypertension, and obesity among healthcare workers.[9] Diabetes places India on the second topmost list in the world with an account of 70 million cases according to the International Diabetes Federation Altas committee.[10] People with diabetes have an increased risk of developing several health problems such as the economic burden of the disease, increased mortality, and reduction in quality of life along with a lower happy mood. Binary logistic regression was used to obtain the predicted probabilities by creating a classification table for the percentage of individuals with diabetes.

Few researchers have aimed at the relationship between lifestyle factors and health. The main objective of the cross-sectional analysis[11] was to evaluate the co-occurrence of multiple risk factors in doctors. A prospective cohort study indicates the lowest proportion of life expectancies for obese men and women who smoked heavily among healthcare workers.[12] The dietary guidelines for Indians have been stated clearly in the manual.[13] Diet plays a crucial role in the well-being of an individual. So, it is the case with doctors. Imparting a diet plan according to each individual body is essential to avoid any risk factors related to health. There are multiple numbers of studies that emphasize on the prevalence of lifestyle factors around the general population. However, there are only a few studies that focus on lifestyle factors among doctors in India.[3,14,15]

There is compatible evidence between physicians' health choices and the guidance through which they advise their patients.[16] On the other hand, they have to monitor their own health in order to take care of others in an exigent environment. Few studies published during the period of 2015 depicted an increase in cardiovascular disease among healthcare workers. A major reason for rising of such a disease was due to diabetes, hypertension, and obesity showed a strong association all over the world.[17] At present, this goes in contrast to our study pattern.

The need of this study is to evaluate how important is the health concern of doctors. The limitation of our paper is that data collection was done during the pandemic period and the questionnaire was filled up through online mode. It has not only given true insight into the current lifestyle factors of doctors with respect to significant factors but also estimates the happiness score for the first time with respect to the Indian dataset.

Happiness is a desire for humankind. It is the quality that helps in self-evaluation of contentment toward life goals. Although this study was reliant on self-reported lifestyle variables which further lead to the prevalence of measurement errors. However, these random errors can be reduced by repeated assessments and commutatively averaging the values. The happiness score is an essential index for evaluation. It lowers our risk for chronic diseases, enables a better sleep pattern, reduces stress, and helps us to maintain optimum body weight by means of regular exercise or physical activity. Doctors play a crucial role in maintaining the healthcare of the people. A little bit more emphasis laid on physical activity can have a better influence on healthcare.

Conclusion

Self-reported social and demographic characteristics form a prospect for testing of significance for covariates. The aggregation of food components played a significant role in assessing the quality with respect to their lifestyle. There is no significant intake of alcohol and tobacco and no major cases are observed in doctors for diabetes and hypertension. Additional variables such as playing a musical instrument, enjoying spending time with pets, and physical activity have a low moderate influence on the happiness score. The profession is also a significant factor that causes a lack of sleep among doctors with respect to gender. Happiness score value has been estimated depending on their lifestyle patterns. Thus, two major significant components like dietary habits and profession have been plotted by using a violin plot against the happiness score value.

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