International Journal of Health Sciences and Research
Volume 14; Issue: 6; June 2024
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Comparison of Breath Hold Time Among Farmers and Nonfarmers Population

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DOI: https://doi.org/10.52403/ijhsr.20240632

ABSTRACT

Background: Farmers represent distinct demographic group, exposed to unique environmental conditions and occupational factors. Farmers exposed to pesticides which can impact on lung function. This study aims to compare Breath hold time between farmer and non farmer to reveal the impact contributing insights into health influences in both groups.
Methodology: A total of 120 participants, aged between 30-55, both male and female, used pesticides on regular basis were included in the study. Participants were selected on the base of inclusion and exclusion criteria.
Result: SPSS Version 29 Software was used for Data Analysis. Mann Whitney U test was used to compare breath hold time among farmer and non farmer. The level of significance was kept p <0.05. The mean value of Breath hold time is (Farmer15.86, Nonfarmer21.43 <0.01). Significant differences were found among the group on breath hold time.
Conclusion: This study's finding reveals a low breath hold time among farmer in comparison to non farmer.

Keywords: Breath hold time, farmer, non farmer, pesticide

INTRODUCTION

Farmers work in some aspect of agriculture, growing vegetables, grains, or fruit; or raising animals for milk, eggs, or meat. (1) Around 53.19 lakh farmers are officially registered in Gujarat; of them, 20.17 were marginal farmers, followed by 16.15 lack small farmers, 11.50 lack semi-medium farmers, 4.95 lack medium farmers, and 39,893 big farmers.(2)

Women are actively involved in farm labor, facing unique physical demands and environmental exposure inherent to agriculture.

Women in rural areas are participating in the economy more and more. According to the survey, the rural female labor force participation rate (FLFPR) increased noticeably from 19.7% in 2018–19 to 27.7% in 2020–21(3). Globally, two million tons of pesticides are used annually in agriculture and other industries.(3)

According to the survey, 47% of the population depends on agriculture for a living, while 65% of the population stays in rural areas as of 2021 data. Therefore, it is important that the government focus on rural development. (3)

One of the primary causes to chronic respiratory symptoms and illnesses is occupational exposure, farming and related activities play a major part in this. (4)

Pesticide exposure in farming communities has been associated with respiratory and cardiovascular health risks.

Pesticide damages the lung tissue after entering the lung though inhalation and absorption from the systemic circulation. (5) A strong body of research points to a connection between respiratory problems and occupational pesticide exposure. Lung function growth restriction has also been linked to some organophosphate insecticides. (6)

Very few studies have been done on chronic pesticide exposure, and the majority of clinical investigations on the topic have focused on acute exposure. Pesticides are compounds with the potential to be hazardous to humans and to have negative health impacts. (7,8,9,10)

When pesticides come into touch with the skin and mucous membranes, or are inhaled, they can have negative health consequences on humans. Inhalation will be one of the primary methods of occupational exposure. Two earlier systematic assessments evaluated how exposure to pesticides affected lung health. (11).

The breath-holding test (BHT) is a simple and rapid test that can be used to evaluate cardiopulmonary function. This test can be easily performed at any place, even in patients who cannot ambulate. BHT has been used in respiratory physiology to measure ventilator response and may predict outcomes in patients with various respiratory abnormalities. (12,13,14,15)

Current study understanding potential difference in respiratory health between the farmer and nonfarmer population. factors such as a exposure to agricultural pollutant, physical exertion, pesticides and unique occupational hazard may impact lung function.

MATERIALS & METHODS

Ethical clearance was obtained from the ethical committee of the institute. A Cross-Sectional observational Study was conducted in Shidhapur, India, after approval from the institutional ethical committee. The convenient sampling method was used. A total of 120 farmers and non farmers were selected of those, 60 were farmers and 60 were non farmers. Farmers (used pesticide more than 5 years) and non farmers(those who have not related to farming work, those who are doing desk job) were selected on basis of inclusion and exclusion criteria. The study included both male and female participate the age between 30 to 55 years. Who expressed their willingness to participate. The subjects were explained properly and shown now to do test correctly and data of test was recorded on the data sheet. Those with metabolic disorders (such as diabetes), Cardiorespiratory condition like (COPD or asthma), postural deformity, cardiac surgery (like CABG), history of major surgery, recent fracture was excluded. Additionally, individuals with current illness like cold, fever, or cough were not included. Breath-holding time test - subjects were asked to sit quietly and breathe normally. At the end of the normal exhalation, Subjects were instructed to do maximum inspiration after that they had pinch their nose and hold his/her breath as long as possible. The total breath-holding time (seconds) was recorded, with the longest BHT time used for outcome measures. [(16)]. A stopwatch was used to record the breath-holding time. A rest of one minute was given between the trails. Three trials were given to subjects.

STATISTICAL ANALYSIS

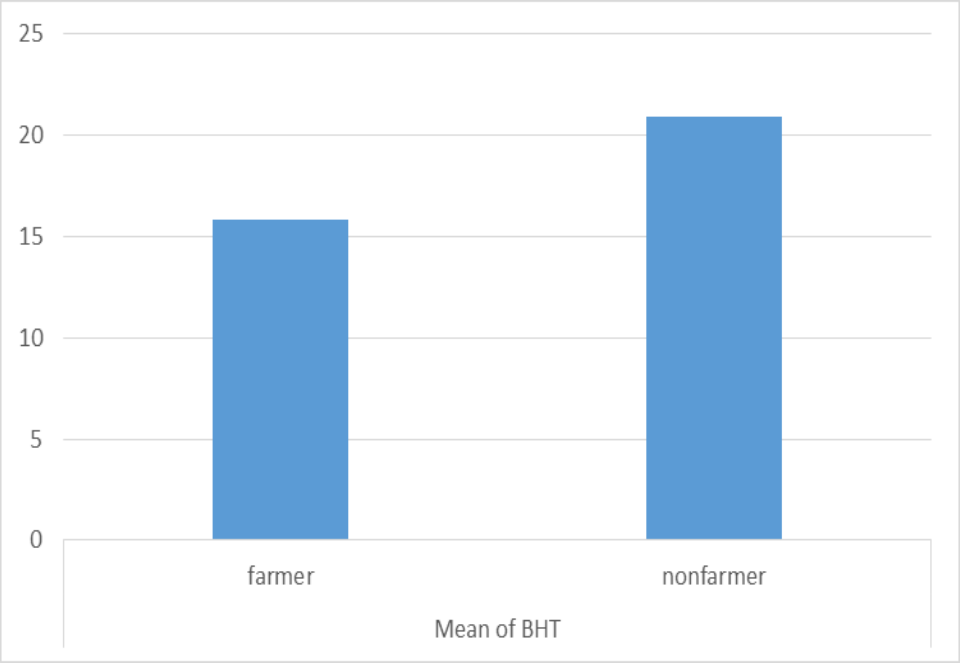
Statistical analysis was performed using SPSS version 29 software and data was collected from villages and cities in Gujrat. The Shapiro-Wilk test test was used to test the normal distribution of the data and found that the data was not normally distributed. therefore, Mann Whitney U-test was used to compare breath hold time in farmers and nonfarmers population.

RESULT

Out of 120 participants, 60 were farmers and 60 were nonfarmers. Statistical analysis was performed using SPSS version 29 for data analysis. The level of significance was kept $p < 0.05$. The mean value of Breath hold time is (15.86, 21.43 <0.01).

Significant differences were found among the group on breath hold time.

	Farmers	Non farmers	P value
Breathholdtime (MEAN± SD)	**15.86± 2.15**	**21.43± 2.06**	**< 0.01**



DISCUSSION

The current study was observational study measure breath hold time in farmers and non farmers population aged 30 to 55 years old. Total 120 participant were selected among them 60 farmers and 60 non farmers. Aneeta Khoso,1 et al in 2019[17] they studied that research was on determining the frequency of respiratory symptoms and illnesses and exploring occupational factors contributing towards the development of respiratory problems. Most of the findings closely match the results of the literature available on prevalence of respiratory symptoms and illnesses indifferent occupational settings where dust and pesticide exposure are common. A study conducted among farmers in Brazil showed 6.4% having chronic cough while 8.6%farmers having chronic phlegm. Asthma symptoms were reported in 12% farmers while 22% farmers reported having symptoms of chronic respiratory disease. The reason for the increased frequency of symptoms among our study participants could be the virtual absence of personal protective equipment during work in the farms. These activities included mixing, preparing, spraying and storage of pesticides. Personal protective measures were found to be observed by the farmers of Brazil, who reported less frequent respiratory symptoms compared to our population

Jina yeo, Ju Yeon Kim et al in 2022[18] they study that the BHT can be a reliable, valid and simple test to measure overall pulmonary function in SSc patients. BHT times showed robust correlations with Borg dyspnoea scale scores, FVC (l), %DLCO, PASP (mmHg) and SHAQ. To our knowledge, this is the first report investigating the utility of BHT in SSc patients. BHT can be performed at any location where a patient can sit. It takes <1 min only, as the mean BHT time was 38.4 (15.7) s in our SSc patients. It can also be performed in patients with severe dyspnoea in whom 6MWT cannot be performed. BHT showed excellent reliability in this study, with an overall ICC of 0.943 as assessed by the stability of two

separate measurements performed at intervals of 1–14 days. Its reliability was found to be excellent in both face-to-face and televideo BHTs, with no difference in face-to-face or a televideo system.

Abir hedhli[1] et al in 2021[(19)] they study that we conducted a cross-sectional study including patients with confirmed and stable COPD they found results showed that maximal voluntary inspiratory breath hold time was significantly correlated with FEV1, FVC, FEV1/FCV ratio, COPD GOLG stage and 6MWT distance. Besides, maximal voluntary inspiratory breath hold time was shown to have good discriminating power for severe form of COPD with AUC of o.822.

Anil Tibdewal et al (2015) [(20)] conducted study on breath holding time in various phase of respiration and effect of respiratory training in lung cancer patients. study included one hundred consecutive patients with lung cancer planned for radical RT/chemo radiation. baseline pulmonary function test (PFT) was performed in all patients, and respiratory training was given from the day of RT planning. study concluded that BH was well tolerated by most lung cancer patient with minimum median BH time of at least 16 sec in any of the three phases of respiration. Respiratory training improved mid ventilation breath hold time while consistently maintaining deep expiration breath hold time throughout the course of radiotherapy.

CONCLUSION

Our study finding suggest that a low breath hold time among farmer in comparison to non farmer. The study clearly indicates that farmers demonstrate a notably shorter breath-hold time in contrast to non-farmers, pointing to distinct respiratory patterns associated with agricultural work. This observation underscores potential health considerations specific to individuals engaged in farming activities.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Payal Keshaji Thakor, Gira Thakrar. Comparison of breath hold time among farmers and nonfarmers population. *Int J Health Sci Res.* 2024; 14(6):215-219. DOI: *https://doi.org/10.52403/ijhsr.20240632*

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