Original Article

Correlation Between Occupation and Azoospermia among Industrial Workers in District Faisalabad, Pakistan

M Adeel Alam Shah[1], Laraib Imdad[1], Sajjad Ghani[2], Farhat Humayun[1], Quddus Ur Rehman[1] and Saira Mushtaq[2]

ABSTRACT

Objective: The main focus of study was to check the incidence of Azoospermia among these workers for any correlation with their occupation.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the AS&RB of Khyber Medical University, Peshawar and Khyber Medical College, Peshawar from start of January to the end of June in year 2019.

Materials and Methods: After informed consent, semen samples were taken from married men who visited fertility clinics and laboratories for semen analysis. A questionnaire was made to input their data regarding their duration of their job, personal history and other medical condition. Semen analysis was performed by using computer assisted technique. Sample with zero sperm count was noted and presented in statistical analysis.

Results: Total 360 males were included in this study after applying exclusion criteria. These were evenly divided into three groups according to their occupation. From 360 samples, 51 were having zero sperm count, in which 11 were farmers (9.2%), 19 were textile industry workers (15.8%) and 21 belongs to oven workers (17.5%).

Conclusion: From result section it is concluded that incidence of Azoospermia was highest among oven workers followed by textile industry workers and farmers.

Key Words: Azoospermia, low sperm count, male infertility, semen analysis

Citation of article: Shah MAA, Imdad L, Ghani S, Humayun F, Rehman Q, Mushtaq S. Correlation between Occupation and Azoospermia Among Industrial Workers in District Faisalabad, Pakistan. Med Forum 2022;33(1):81-83.

INTRODUCTION

Male fertility is a major concern these days. Incidence of poor semen parameters are increasing rapidly from past few years. This become a topic of interest among medical researchers to identify the environmental and nutritional factors causing poor semen parameters and total sperm count.[1,2] To check the fertility of male, a routine semen analysis test is performed at abstinence of 3-5 days in laboratory. Total active sperm count describes the fertility of a male. If this count falls below the optimal level (oligozoospermia) or become zero (azoospermia) as per WHO criteria.[3]

Studies done in the past identify that high heat effects normal spermatogenesis. High testicular temperature is hostile for sperm, this drastically decreased sperm counts which is reversible, and i.e. if high heat has been removed the total sperm count will be resumed. This has been studied in 2019.[4] Furthermore high heat also cause low sperm motility and affects its morphology.[5] Studies also revealed that some industrial chemicals which are used in coloring and dyeing of clothes in textile industries are also among toxic to spermatogenesis. Prolong exposure to these chemicals decreased sperm production and motility along with increased sperm mortality.[6,7] Similar studies also identify few pesticides are also considered to be one of the main cause of male infertility in farmers and gardeners.[8]

So after extensive review of literature a study was conducted to check the correlation between these risk factors related to different jobs and their impact on workers in district Faisalabad, Pakistan.

[1.] Department of Anatomy / Biochemistry[2], Aziz Fatimah Medical & Dental College, Faisalabad.

Correspondence: Dr. Farhat Humayun, Assistant Professor of Anatomy, Aziz Fatimah Medical & Dental College, Faisalabad.
Contact No: 03236046746
Email: 3maanbrothers@gmail.com

Received: June, 2021
Accepted: November, 2021
Printed: January, 2022

MATERIALS AND METHODS

After approval from AS&RB of Khyber Medical University, Peshawar and graduate committee of Khyber Medical College, Peshawar, a cross sectional study was performed on Pakistani married men from age 25 to 55 years, visited at different fertility clinics in Faisalabad, Punjab, Pakistan. After informed consent from patient and data collection via questionnaire semen samples were taken at lab in vicinity of fertility clinics under supervision of qualified lab technicians. One-time semen sample was considered as standard

sample and exclusion criteria were applied. These samples were grouped according to occupation and computer assisted semen analysis was performed.

This study was performed from start of January to the end of June in year 2019. A Questionnaire was made which contains basic information regarding age, duration of marriage, occupational history, duration of occupation and time spend at working place, socioeconomic history and any past medical history.

The data was collected and analyzed as per WHO criteria.[3] Statistical analysis was done by using SPSS v23. One-way ANOVA and LSD tests are used to compare means of each group for correlation.

RESULTS

Out of 360 semen samples, it was noted that 51 were having zero sperm account i.e. azoospermia. From these 51 azoospermic samples 11 were farmers (9.2%), 19 were textile industry workers (15.8%) and 21 belongs to oven workers (17.5%) as shown in following table.

Table No.1: Distribution of respondents regarding their sperm count and group type

			Group			Total
			Farmer/ Gardener	Industry Worker	Oven/ Baker Worker	
Sperm Count	No Sperm	Count	11	19	21	51
		% within Group	9.2%	15.8%	17.5%	14.2%
	Sperm Present	Count	109	101	99	309
		% within Group	90.8%	84.2%	82.5%	85.8%
Total		Count	120	120	120	360
		% within Group	100.0%	100.0%	100.0%	100.0%

Chi Square value= 3.838^{NS} P-Value= 0.147 NS = Non-Significant (P>0.05)

Table shows the incidence of azoospermia among different groups and correlation of their mean values. This also calculates the percentage or azoospermia among each group.

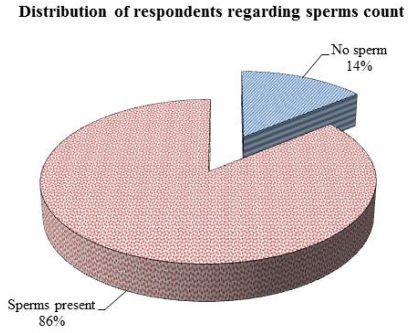

Figure No.1: Graphical representation of samples having sperms present vs no sperms

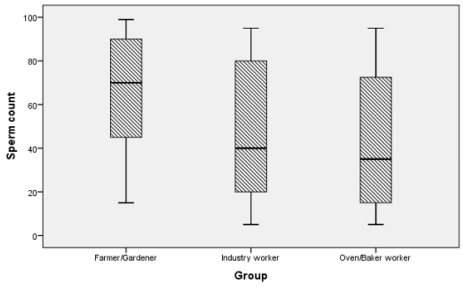

Figure No.2: Graphical representation of sperm counts and their mean values among different groups

DISCUSSION

Faisalabad is the largest and densely populated city of Pakistan. Most of its population is related to laborious jobs such as farmers, textile industry and oven workers. Prolong summer and increasing air and water pollution are the emerging problems of this city. Study shows that job related factors along with pollution effects male reproductive health.[9,10] In order to address this problem, a study was conducted on semen analysis of married men related to different occupations in district Faisalabad. Main aim was to check the incidence of azoospermia in correlation to their occupation as shown in Figure. 1.

Among all three groups, incidence of azoospermia was highest in oven/bakery workers. Decreased sperm count was also reported among them as shown in Fig. 2. These findings are in correlation with studies done worldwide.[11,12] This might be the fact that high heat has negative impact on spermatogenesis, furthermore prolong sitting on tandoor (stove for making traditional bread) might be a cause of zero or low sperm count among this community.[13]

Textile industry workers shows identical findings as compared to oven workers and bakers. Although their sperm count was better, but azoospermia was remarkably on higher side. These results were similar to the studies done internationally.[14,15] This might be due to exposure of hazardous industrial chemicals. During study it was noted that most of industrial workers didn't follow safety protocols for toxic chemicals. No personal protective equipment usually practiced in small industries related to dyeing and coloring units, high heat and poor ventilation were also noted. According to different studies done in the past, these hazardous factors might be considered as the cause of azoospermia and decreased sperm count among them.[16,17]

Azoospermia among farmers and gardeners were only 9.2%. Comparatively better values than other two groups. But statistically highly significant as compared to total population. Our findings are in correlation with studies done in the past as the trend of azoospermia is increasing among farmers worldwide.[18] Hazardous

pesticides may be the cause of low or zero sperm count among farmers.

The results of our study identifies the hazardous factors related to their job, such as high heat in extreme hot weather for oven workers and bakers, textile chemicals for textile industry workers and pesticides for farmers. Moreover, data also presents the number of sperms present in each group as well. Hence we did not rule out any anatomical defect for azoospermia such as obstructive cause. So a thorough study is advised in this direction for further analysis and root cause.

CONCLUSION

From result section it is concluded that incidence of Azoospermia was highest among oven workers followed by textile industry workers and farmers. Although a thorough study is advised for other factors such as smoker vs non-smoker and any underlying obstructive causes for azoospermia.

Author's Contribution:

Concept & Design of Study:	M Adeel Alam Shah
Drafting:	Laraib Imdad, Sajjad Ghani
Data Analysis:	Farhat Humayun, Quddus Ur Rehman, Saira Mushtaq
Revisiting Critically:	M Adeel Alam Shah, Laraib Imdad
Final Approval of version:	M Adeel Alam Shah

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Danielewicz A, Przybyłowicz KE, Przybyłowicz M. Dietary patterns and poor semen quality risk in men: a cross-sectional study. Nutrients 2018;10(9): 1162.
2. Ajayi AB, Afolabi BM, Ajayi VD, Oyetunji I. Low Sperm Counts: Biophysical Profiles of Oligospermic Males in Sub-Saharan Africa. Open J Urol 2018;8(08):228.
3. Cooper TG, Noonan E, Von Eckardstein S, Auger J, Baker H, Behre HM, et al. World Health Organization reference values for human semen characteristics. Human Reproduction Update 2010;16(3):231-45.
4. Abdelhamid MHM, Esquerre-Lamare C, Walschaerts M, Ahmad G, Mieusset R, Hamdi S, et al. Experimental mild increase in testicular temperature has drastic, but reversible, effect on sperm aneuploidy in men: A pilot study. Reproductive biol 2019;19(2):189-94.
5. Aldahhan RA, Stanton PG. Heat stress response of somatic cells in the testis. Molecular and Cellular Endocrinol 2021;527:111216.
6. Oudir M, Chader H, Bouzid B, Bendisari K, Latreche B, Boudalia S, et al. Male rat exposure to low dose of di (2-ethylhexyl) phthalate during pre-pubertal, pubertal and post-pubertal periods: Impact on sperm count, gonad histology and testosterone secretion. Reproductive Toxicol 2018;75:33-9.
7. Sharma A, Mollier J, Brocklesby RW, Caves C, Jayasena CN, Minhas S. Endocrine-disrupting chemicals and male reproductive health. Reproductive Med Biol 2020;19(3):243-53.
8. Lwin TZ, Than AA, Min AZ, Robson MG, Siriwong W. Effects of pesticide exposure on reproductivity of male groundnut farmers in Kyauk Kan village, Nyaung-U, Mandalay region, Myanmar. Risk management and healthcare policy 2018;11:235.
9. Yucel C, Kozacioglu Z. Effect of seasonal variation on the success of micro-dissection testicular sperm extraction: A pilot study. Andrologia 2019;51(1):e13156.
10. Zou P, Sun L, Chen Q, Zhang G, Yang W, Zeng Y, et al. Social support modifies an association between work stress and semen quality: Results from 384 Chinese male workers. J Psychosomatic Res 2019;117:65-70.
11. Hasan FS, Yassin BAG. Seminal Fluid Abnormality among Infertile Males: A Two-Center Based Study in Baghdad. Iraqi Postgraduate Med J 2020;19(2).
12. Shah MAA, Inayat Q, Ali M, Mughal IA, Imdad L, Javed M. Correlation between Occupation and Sperm Morphology along with Sperm Count in Industrial Workers in District Faisalabad, Pakistan. Pak J Med Health Sciences 2021;15(2):324-6.
13. Hamerezaee M, Dehghan SF, Golbabaei F, Fathi A, Barzegar L, Heidarnejad N. Assessment of semen quality among workers exposed to heat stress: a cross-sectional study in a Steel Industry. Safety and health at work 2018;9(2):232-5.
14. Boulicault M, Perret M, Galka J, Borsa A, Gompers A, Reiches M, et al. The future of sperm: a biovariability framework for understanding global sperm count trends.Human Fertil 2021;1-15.
15. Abdollahi M-B, Dehghan SF, Balochkhaneh FA, Moghadam MA, Mohammadi H. Comparison of mice'sperm parameters exposed to some hazardous physical agents. Environmental Analysis, Health Toxicol 2021;36(3).
16. Ilieva I, Sainova I, Yosifcheva K. Toxic Effects of Heavy Metals (Lead and Cadmium) on Sperm Quality and Male Fertility. Acta morphologica et anthropologica 2020;27:3-4.
17. Yang H, Wang J, Yang X, Wu F, Qi Z, Xu B, et al. Occupational manganese exposure, reproductive hormones, and semen quality in male workers: A cross-sectional study. Toxicol Industrial Health 2019;35(1):53-62.
18. Sunanda P, Panda B, Dash C, Padhy RN, Routray P. Semen quality among different professional groups: A retrospective study in a teaching hospital. Middle East Fertility Society J 2018;23(3):220-4.