Research Paper

Determination of secretor and non-secretor status in relation to ABO blood groups in population of Rawalakot city, Azad Jammu and Kashmir

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Abstract

The present study was designed to find out the status of the secretor and non-secretor in Rawalakot city of Azad Jammu and Kashmir (AJ&K). Blood and saliva were collected from 200 individuals of the study area during 2021-22. Secretor and non-secretor status were determined by Hemagglutination inhibition method. During this study status of secretor and non-secretor has been observed for gender, caste, and ABO blood group. Out of a total of 200 sampled individuals 142 (71%) individuals were secretors, while the remaining 58(27%) were non-secretors. Females (63.5%) were more secretors as compared to males (36.5%). The highest percentages of secretors were observed in Mughals (79.2%) and the lowest in Hashmi (65.0%). The highest numbers of secretors were observed in blood group B (37.0%), while the lowest in Blood group A (20.5%). The study concluded that secretors were more common in Rawalakot city as compared to non-secretors. This information would be helpful in healthcare management in the area.

Introduction

An Austrian scientist Karl Landsteiner discovered the ABO blood group system (Saboor et al., 2014). Putkonen (1930) categorized individuals into two groups i.e., secretors and non-secretors according to their capacity to secrete ABH antigens (Woike et al*., 2017*). Body fluids i.e., saliva, sweat, tears, semen, and serum are body secretions in which ABO secretor put off their blood group antigen. On the other hand, blood group antigens are not released by non-secretors in their body fluid (D'Adamo

& Kelly, 2001). The prevalence of hepatitis B infection, type 1 diabetes and human immunodeficiency virus infection (HIV) has been associated more to non-secretors (Nadia, 2014). Similarly, non-secretors have a higher frequency of persistent periodontitis and gingivitis as compared to secretors (Tabasum et al., 2011). Non-secretor females have a greater chance of suffering from idiopathic vulvovaginal candidiasis (Ben-Aryeh et al., 1995). ABH non-secretors have more chances of thrombosis and heart disease because they have an affinity to developed factor VIII and von Willebrand factor (VWF). Moreover, ABH non-secretors are more susceptible to various other diseases like urinary tract infection, candida infection, duodenal ulcer, autoimmune disease ankylosing spondylitis, Graves disease, Sjogren syndrome and psoriatic multiple sclerosis etc. (D'Adamo & Kelly, 2001).

A person having VWF and VIII factor showed smaller bleeding and has more chance of heart disease (Kyrle et al., 2000). The ratio of VWF and VIII factor is less in individuals having blood group O secretor (Klarmann et al., 2010). The degree of mouth, epithelial dysplasia, and esophageal cancer are more in non-secretors (Campi et al., 2012). The above discussion revealed that knowledge of both groups of these people is important for their healthcare management. However, the distribution status of both types of people were not determined in the study area. Therefore, the current study was carried out to determine the status of the secretors and non-secretors along with their blood group among the population of Rawalakot city.

Materials and Methods

A total of 200 individuals were randomly selected from the population of Rawalakot city of district Poonch, Azad Jammu and Kashmir during 2021-22. Rawalakot is located at Latitude 33°51'32.18"N, Longitude 73°45'34.93"E at about 1600-meter elevation above sea level. Rawalakot has an urban population of 56,006 people according to the 2017 census (GoAJ&K, 2019).

Collection and processing of saliva

By using all safety measures sterilized disposable plastic containers were used for storage of 2 ml of saliva. Centrifuge the tubes containing saliva at 2000 rpm (revolution per minute) for ten minutes. This supernatant was moved into another glass tube. The salivary amylase was denatured by placing the saliva supernatant in a water bath for ten minutes at 2000 rpm. These glass tubes were taken out from the water bath and cooled. Again, centrifuge for ten minutes at 2000 rpm. The normal saline solution was poured into these tubes for determination of ABH secretor (Mavridis & Achimastos, 1974).

Preparation of RBCs

The blood collected in EDTA vials, poured in falcon tubes, and centrifuged for three minutes at 1500 rpm. After centrifugation plasma and RBCs were separated. The water and salt solution (saline solution) were transferred in tubes encompassing cells. Then centrifuged this material for three minutes

and the process was repeated twice. Washing was carried out and tubes were centrifuged again for three minutes at 3000 rpm. The presence of cell trailing, and transparent supernatant shows suitable washing.

Haemagglutination inhibition method

At last, antisera were put in saliva tubes and incubated for ten minutes at room temperature. After that red blood cell was also added and incubated for 45 minutes at 37 °C. Agglutination of RBCs indicates that person is a non-secretor and absence indicates the person is a secretor.

Statistical analysis

Analysis of data was performed using SPSS version 23 and the percentage was found by the descriptive statistics.

Results and Discussion

The current study was designed to determine the status of the secretor and non-secretor regarding the ABO blood group in Rawalakot city. A total of 200 individuals were randomly selected of which 142 were secretors and 58 were non-secretors. The secretor and non-secretors were 71% and 29 % respectively. In this study, a total of 127 (63.5%) females have participated of which 103 (72.5%) were secretors and 24(41.3%) were non-secretors. The total number of males were 73(36.5%) having 39(27.5%) secretors and 34(58.6%) non-secretors. Thus, females were more secretors than males (Table 1).

Table 1: Gender wise distribution of Secretors and non-Secretors in Population of Rawalakot city during 2021-22

| | | | Gender | | |
			Female	Male	Total
Status	Secretor	Count	103	39	142
		% within Status	72.5%	27.5%	100.0%
		% within Gender	81.1%	53.4%	71.0%
	Non-secretor	Count	24	34	58
		% within Status	41.4%	58.6%	100.0%
		% within Gender	18.9%	46.6%	29.0%
	Total	Count	127	73	200
		% within Status	63.5%	36.5%	100.0%
		% within Gender	100.0%	100.0%	100.0%

The people of the study area belong to six castes including Mughal, Chaudary, Sudhan, Qazi, Syed, and Hashmi. The people of these castes have shown variation in the percentages of secretors and non-secretors (Table 2). Among Mughals, 48 individuals were observed during this study, most of them (79.2%) were secretors and 20.8 % were non-secretors, while within status 26.8% were secretors and 17.2% were non-secretors. The secretors and non-secretor within Chaudary caste were 72.2% and

27.8% and within status is 9.2% and 8.6% respectively, and in Sudhans (n=42) caste 66.6% were secretors and 27.6% were non-secretor, while within status 19.7% was secretors and 24.1% were non-secretors. The percentage of secretors and non-secretors within Qazi caste was 69.0% and 39.0% respectively, whereas, within status 14.1% were secretors and 15.5% were non-secretors out of 29 cases. Within the Syed caste, 23 entities observed had 73.9 % secretors and 26.1% non-secretors, while within status 12% secretors and 10.3% were non-secretors. Among 40 individuals of Hashmi, 18.3% were secretors and 24.1% were non-secretors within caste and in status, 65% were secretors and 35.0% were non-secretors. The highest percentage of secretors has been found in the individuals of Mughals and lowest in Hashmis (Table 2).

Table 2: Caste wise distribution of Secretors and non-Secretors in Rawalakot city during 2021-22

Status		Mughal	Chaudary	Sudhan	Qazi	Syed	Hashmi	Total
				Caste				
Secretor	Count	38	13	28	20	17	26	142
	% within Status	26.8%	9.2%	19.7%	14.1%	12.0%	18.3%	100.0%
	% within Caste	79.2%	72.2%	66.7%	69.0%	73.9%	65.0%	71.0%
Non-secretor	Count	10	5	14	9	6	14	58
	% within Status	17.2%	8.6%	24.1%	15.5%	10.3%	24.1%	100.0%
	% within Caste	20.8%	27.8%	33.3%	31.0%	26.1%	35.0%	29.0%
Total	Count	48	18	42	29	23	40	200
	% within Status	24.0%	9.0%	21.0%	14.5%	11.5%	20.0%	100.0%
	% within Caste	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ABO blood group shows a difference in their percentages amongst individuals of different castes. Among the observed individuals, 41 had blood group A, within the blood group 68.3% were secretors and 31.7% were non-secretors, whereas within status 19.7% were secretors and 22.4% were non-secretors. Of the 74 individuals having the blood group B, within blood group 75.7% were secretors and 24.3% were non-secretors, while within status 39.4% were secretors and 31% were non-secretors. Among 42 cases of AB blood group, 69% were secretors and 31% were non-secretor, whereas 20.4% were secretors and 22.4% were non-secretors within the status. Among O blood group (n=43) individuals, 67.4% were secretors and 32.6% were non-secretors, whereas, within status 20.4% were secretors and 24.1% were non-secretors. A higher percentage of secretors was observed in Blood group B (75.7 %) and the lowest in Blood group A (68.3%; Table 3).

Table 3: Percentages of Secretor and non-Secretor based on ABO blood group in Rawalakot city during 2021-22

			Blood group				Total
			A	B	AB	O	
Status	Secretor	Count	28	56	29	29	142
		% within Status	19.7%	39.4%	20.4%	20.4%	100.0%
		% within Blood group	68.3%	75.7%	69.0%	67.4%	71.0%
	Non-secretor	Count	13	18	13	14	58
		% within Status	22.4%	31.0%	22.4%	24.1%	100.0%
		% within Blood group	31.7%	24.3%	31.0%	32.6%	29.0%
Total		Count	41	74	42	43	200
		% within Status	20.5%	37.0%	21.0%	21.5%	100.0%
		% within Blood group	100.0%	100.0%	100.0%	100.0%	100.0%

During this short-term study, a total of 200 individuals were examined for the first time in the study area to explored for determination of their secretor and non-secretor status. During this study, status of secretor and non-secretor has been observed for gender, caste, and ABO blood group. The current study findings are very similar to Woike et al. (2017), they also reported that 72.4% were secretors and 27.6 % were non-secretors in Gwalior. Igbeneghu et al. (2015) explored the local population of South-west Nigeria and found 78.1% secretors and 21.6% non-secretors. The percentage of secretors and non-secretors in the present study is higher than in study by BoKhedher et al. *(*2020) in Saudi Arabia where the secretors were 67% and the non-secretors were 33%. The 68.62% of secretors and 31.38% of non-secretors were revealed by Ullah et al. (2018) in Peshawar. The current study found that females were more secretors than males, however, Sherwani et al. (2014) found that males were more secretors than females. Fakorede et al. (2023) found no significant difference between male and female gender in prevalence of secretors and non-secretors in a Nigerian population. The study concluded that secretors were more common in Rawalakot city as compared to non-secretors and the highest numbers of secretors were observed in blood group B, while the lowest in Blood group A. In a Nigerian population, Fakorede et al. (2023) also recorded more (85%) secretors than non-secretors (15%), however, unlike the current study, the secretor and non-secretor status was independent of ABO blood group. This study would be helpful for health management in the area.

References

Ben-Aryeh, H., Blumfield, E., Szargel, R., Laufer, D., & Berdicevsky, I. (1995). Oral Candida carriage and blood group antigen secretor status: Orale Candida-Keimträger und Blutgruppenantigen-Sekretorstatus. *Mycoses*, *38*(9-10), 355-358.

Bokhedher, R., Al-Shalawi, H., El Dien, W. B. D. K., Mohammed. S., Fagir. M. H., Babikir, M. & Mohsen, D.M. (2020). Effect of gender and ABO blood groups on frequency of ABH antigens secretor status. *Arab Journal of Medical Sciences, 3*(2):18-20.

Campi, C., Escovich, L., Moreno, A., Racca, L., Racca, A., Cotorruelo, C., & Biondi, C. (2012). Expression of the gene encoding secretor type galactoside 2 α fucosyltransferase (FUT2) and ABH antigens in patients with oral lesions. *Medicina oral, patologia oral y cirugia bucal*, *17*(1), e63.

D Adamo, P. J., & Kelly, G. S. (2001). Metabolic and immunologic consequences of ABH secretor and Lewis subtype status. *Alternative Medicine Review*, *6*(4), 390-405.

Fakorede, S., Salami, S., Adekoya, K., & Oboh, B. (2023). Frequency of ABH secretor status: a cross-sectional study in Lagos, Southwestern Nigeria. *Annals of Science and Technology, 0*. https://doi.org/10.2478/ast-2023-0001.

GoAJ&K, *2019.* Statistical Yearbook 2019. *Statistics Azad Jammu and Kashmir*. Retrieved 12 September 2023.

Igbeneghu, C., Olisekodiaka, J. M., Alabi, T., Onuegbu, J. A., Oseni, B. A., & Odaibo, A. (2015). ABH secretors status in Osogbo, Southwestern Nigeria. *International Journal of Modern Biological Research*, *3*, 6-10.

Klarmann, D., Eggert, C., Geisen, C., Becker, S., Seifried, E., Klingebiel, T., & Kreuz, W. (2010). Association of ABO (H) and I blood group system development with von Willebrand factor and Factor VIII plasma levels in children and adolescents. *Transfusion*, *50*(7), 1571-1580.

Kyrle, P. A., Minar, E., Hirschl, M., Bialonczyk, C., Stain, M., Schneider, B., ... & Eichinger, S. (2000). High plasma levels of factor VIII and the risk of recurrent venous thromboembolism. *New England Journal of Medicine*, *343*(7), 457-462.

Mavridis, N., & Achimastos, A. (1974). Secretor Status and Dental Caries. *Journal of Dental Research, 53*, 949 - 949. https://doi.org/10.1177/00220345740530044201.

Nadia, M. C. (2014). *Secretor status, fucosyltransferase 2 (fut2) gene polymorphisms and susceptibility to HIV infections among female sex workers in Nairobi, Kenya* (Doctoral dissertation, University of Nairobi).

Saboor, M., Ullah, A., Qamar, K., & Mir, A. (2014). Frequency of ABH secretors and non secretors: A cross sectional study in Karachi. *Pakistan journal of medical sciences*, *30*(1), 189.

Sherwani, S. K., Ahmad, H., Ahmad, T., Hussain, T., Akbar, S., Zaidi, S. A., & Kazmi, S. U. (2014). Status of Secretor and Non–Secretor with Respect to ABO Blood Group System in Young Population in Karachi-Pakistan. *World J Med Sci*, *10*(1), 22-25.

Tabasum, S. T., & Nayak, R. P. (2011). Salivary blood group antigens and microbial flora. *International journal of dental hygiene*, *9*(2), 117-121.

Ullah, N., Khan, H., Muhammad, M. Z., Khan, F., Umar, I. & Khan, M. (2018). Frequency of secretors and non-secretor among the students at the institute of Paramedical sciences, Khyber Medical University, Pakistan. *Indo American Journal of Pharmaceutical Sciences, 5*(10), 10883-10886.

Woike, P., Iyengar, S., Sharma, D. C., & Gaur, R. (2017). Frequency of ABH secretors/non-secretors and its clinical significance: A cross sectional study in Gwalior. *IOSR Journal of Dental and Medical Sciences*, *16*(6), 116-124.