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Adverse Transfusion Reaction - A Retrospective Study.

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ABSTRACT

Safe blood transfusion practice is integral part of health care system. The risk are minor to severe life threatening. They are immune or non-immune mediated. Several strategies are adopted to minimize Adverse Transfusion Reaction (ATR) rates. Strategies include promotion of voluntary blood donors and reporting ATR. All transfusion reactions reported were analyzed and reviewed at tertiary health care centre in western Maharashtra for a period of 10 years from 2012 to 2021. The present study is based on clinical presentation and laboratory tests after transfusion. Total 55,963 blood bags were issued at various department in the present hospital in last 10 years. Total 32 cases of Adverse Transfusion Reaction (ATR) were reported in the same period. The most cases were of immediate type of reaction reported after transfusion. 3 out of 32 total ATR cases were of haemolytic transfusion reactions. The incidence of ATR is 0.057 % in 10 years. The majority of ATR were Febrile Non Haemolytic Transfusion Reaction (FNHTR) and some Haemolytic Transfusion Reaction (HTR) & allergic reactions. Awareness should be increased among clinicians to prevent, identify and report Adverse Transfusion Reaction. These measures will improve blood transfusion quality and safety.

Keywords: Adverse Transfusion Reaction, Blood Transfusion, Haemovigilance.

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INTRODUCTION

Transfusion of blood products is a double-edged sword. Though it is life-saving, it can also lead to certain adverse reactions which can be fatal. Knowledge about various types of adverse transfusion reactions help not only in their early identification and management but also to prevent the same. The real incidence of these reactions is difficult to estimate because of lack of a proper and strict haemovigilance system in the country [1]. The Haemovigilance Programme of India (HvPI) was launched by the Indian Pharmacopoeia Commission in collaboration with the National Institute of Biologicals on December 10, 2012 [2]. Haemovigilance is a continuous process of data collection and analysis of transfusion-related adverse reactions in order to investigate their causes and outcomes and prevent their occurrence or recurrence. It includes the identification, reporting, investigation and analysis of adverse reactions. A haemovigilance system is also an integral part of quality management in a blood system, triggering corrective and preventive actions, and for the continual improvement of the quality and safety of blood products and the transfusion process [3].

MATERIALS AND METHODS

The current retrospective study is conducted at blood center attached to tertiary care hospital of western Maharashtra region for the period of 10 years from 2012 to 2021. Total 32 adverse transfusion reactions recorded in this period. Before every blood bag issue pre-transfusion checking was done as per blood center guidelines. It included cross-check for clerical error, ABO and Rh grouping of recipient and blood bag, type of blood component, blood unit number, expiry date and inspection of bag for hemolysis, clot and leakage. According to the blood center guidelines at the time of every Adverse Transfusion Reaction (ATR), transfusion reaction form should be filled with – Date and time of initiation and cessation of transfusion, time of reaction, patient's pre and post-transfusion vital signs, approximately volume of blood transfused. Transfusion reaction form along with post transfusion blood samples (Citrate and plain bulb, 2 ml each), urine sample, leftover blood product bag, transfusion set are immediately sent to blood center. Blood center perform thorough evaluation of suspected transfusion reaction, recheck blood requisition form, returned blood component unit number, ABO-Rh grouping, screening of irregular antibodies. Blood grouping of pre and post-transfusion samples done for confirmation and hemolysis comparison. Blood bag, attached blood transfusion set are inspected for hemolysis, discoloration, clot or leakage. Leftover blood bag and blood transfusion set are sent to microbiology department for bacterial investigation.

Table 1: Classification of Adverse Transfusion Reactions (ATR).

	Acute Immmunologic	Acute Non Immmunologic	Delayed Immmunologic	Delayed Non Immmunologic
1)	Acute Haemolytic	Transfusion associated sepsis	Alloimmunization, RBC antigens	Iron overload
2)	Febrile Non Haemolytic	Hypotension associated with ACE inhibition	Alloimmunization, HLA antigens	
3)	Urticarial	Transfusion associated circulatory overload (TACO)	Delayed Hemolytic	
4)	Anaphylactic	Nonimmune hemolysis	Graft-vs-host disease	
5)	Transfusion related acute lung injury (TRALI)	Hypocalcemia (ionized calcium/citrate toxicity)	Post-transfusion purpura	
6)		Air embolus		
7)		Hypothermia		

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RESULTS

In the present study, out of 62,998 issued units, 32 (0.05%) ATR noted. Types of ATR in descending order are FNHTR 29 (90.62%), Mismatched transfusion reaction 2 (6.25%) and Delayed transfusion reaction 1 (3.12%). Component wise ATR recorded by PCV - 28 (87.5%) are maximum. While remaining ATR by other blood type are Whole Blood - 3 (9.37%), FFP - 1 (3.12%). Female - 19 (59.37%) are more affected than Male - 13 (40.62%). Maximum cases seen in department of Maternity ward - 10 (31.25%). No ATR recorded in year – 2012 and 2017. No ATR seen with Platelet transfusion.

Table 2: Year wise component issue with ATR.

Year	Total issued Whole Blood (WB)	Total issued components	Packed Cell Volume (PCV)	Fresh Frozen Plasma (FFP)	Platelet (PLT)	Total ATR
2012	1907	2710	1324	1220	166	**00**
2013	1461	4148	1909	1869	370	**02**
2014	747	4281	2103	1818	360	**05**
2015	475	4743	2241	2010	492	**05**
2016	569	4975	2457	2351	167	**02**
2017	443	4746	2584	2027	135	**00**
2018	417	6666	3756	2444	466	**03**
2019	343	8192	4586	2085	1521	**03**
2020	407	8287	4469	2510	1308	**05**
2021	277	7204	4229	2046	929	**07**
Total	**7046**	**55952**	**29658**	**20380**	**5914**	**32**

Table 3: Blood component wise ATR.

Year	Packed Cell Volume (PCV)	Whole Blood (WB)	Fresh Frozen Plasma (FFP)	Total ATR
2012	-	-	-	**00**
2013	02			**02**
2014	04	01		**05**
2015	04	01		**05**
2016	02			**02**
2017	-	-	-	**00**
2018	03			**03**
2019	03			**03**
2020	05			**05**
2021	05	01	01	**07**
Total (%)	**28 (87.5)**	**03 (9.37)**	**01 (3.12)**	**32**

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Table 4: Male and Female wise ATR.

Year	Female	Male	Total ATR
2012	00	00	**00**
2013	01	01	**02**
2014	03	02	**05**
2015	03	02	**05**
2016	02	00	**02**
2017	00	00	**00**
2018	02	01	**03**
2019	02	01	**03**
2020	01	04	**05**
2021	05	02	**07**
Total (%)	**19 (59.37)**	**13 (40.62)**	**32**

Table 5: Department wise ATR.

Year	Mat	Paeds	Ortho	Onco	Burns	Gynae	Surg	Med	ICU	Total ATR
2012	-	-	-	-	-	-	-	-	-	**00**
2013		01							01	**02**
2014	01	01	01	01	02					**05**
2015	01	01	01	01		01				**05**
2016	02									**02**
2017	-	-	-	-	-	-	-	-	-	**00**
2018	01	01	01							**03**
2019	02	01								**03**
2020	01	03					01			**05**
2021	02	01	01			01	01	01		**07**
Total (%)	**10 (31.25)**	**09 (28.12)**	**04 (12.5)**	**02 (6.25)**	**02 (6.25)**	**02 (6.25)**	**02 (6.25)**	**01 (3.12)**	**01 (3.12)**	**32**

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Figure 1: Department wise ATR.

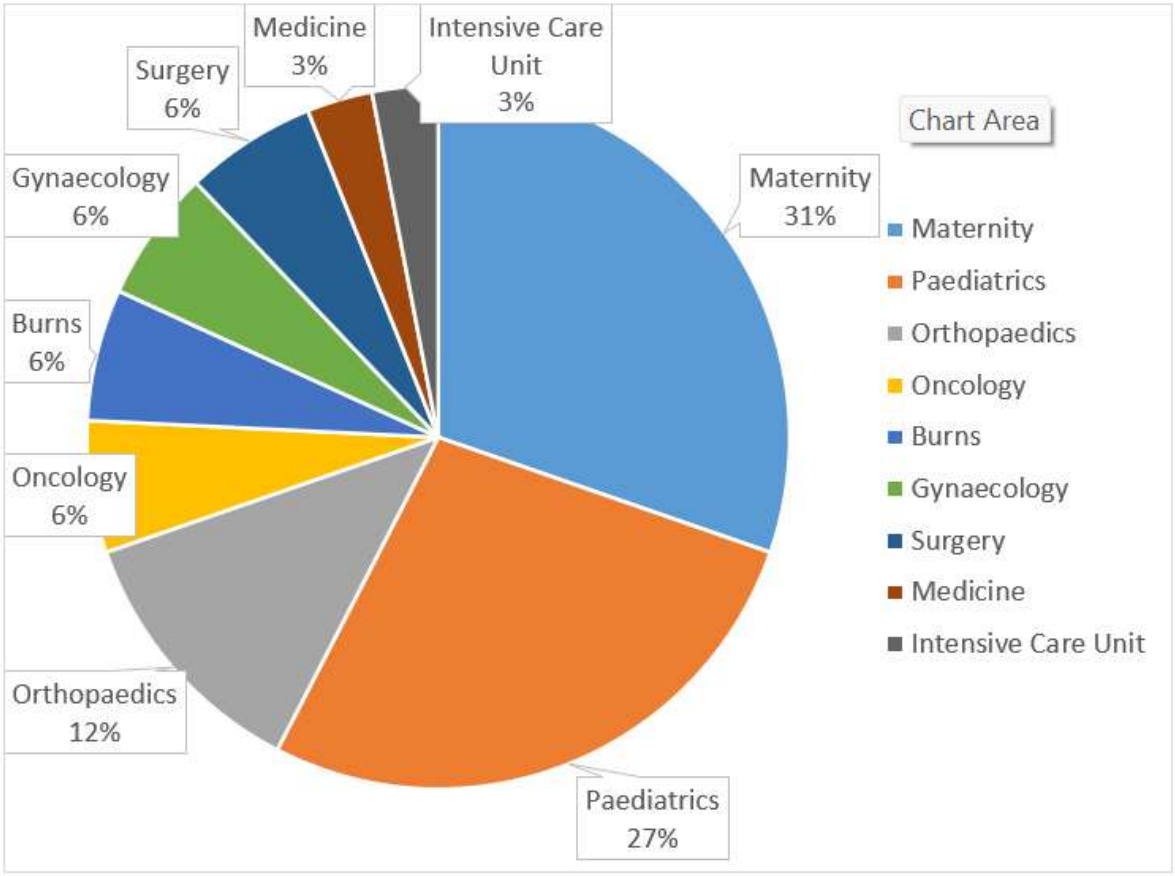

Table 5: Type wise ATR.

Year	Febrile Non Haemolytic Transfusion Reaction	Mismatched Transfusion Reaction	Delayed Transfusion Reaction	Total ATR
2012	-	-	-	00
2013	02			02
2014	06			05
2015	06		01	05
2016	01	01		02
2017	-	-	-	00
2018	03			03
2019	03			03
2020	04	01		05
2021	07			07
Total (%)	29 (90.62)	02 (6.25)	01 (3.12)	32

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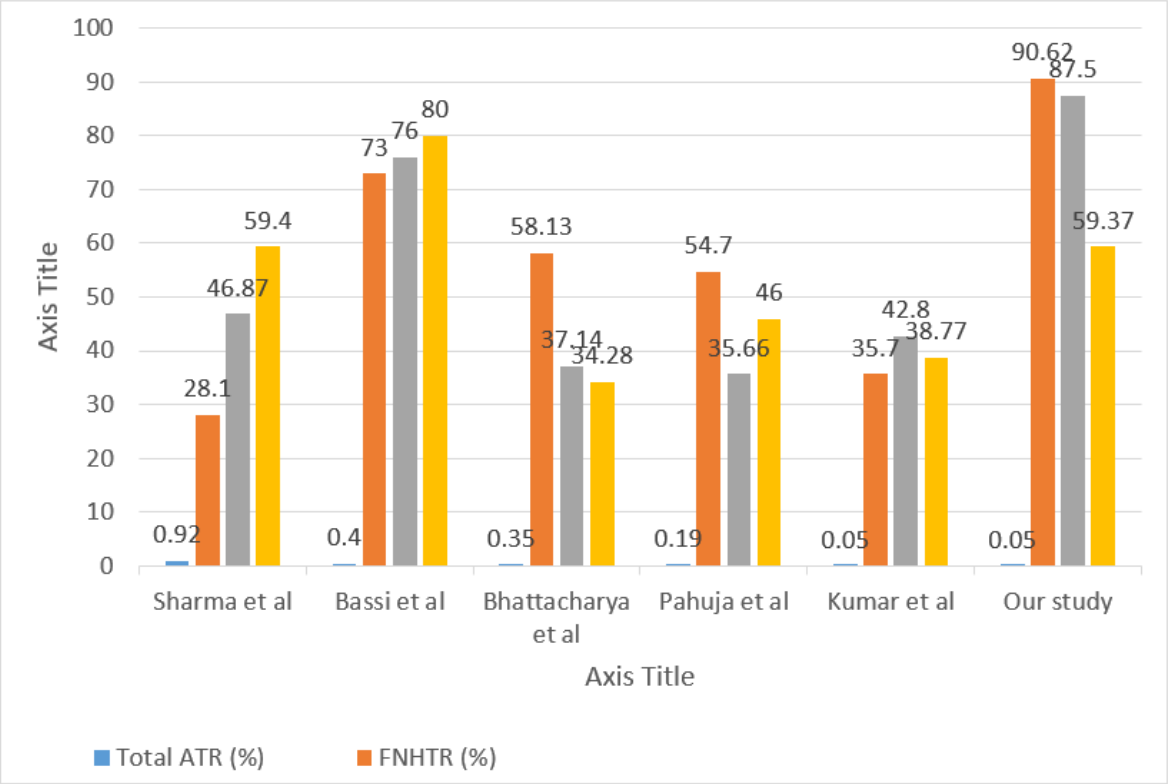
DISCUSSION

ATR rate in current study is 0.05% (32 of 62,998 issued units). This rate is lower than published studies ranging from 0.19 to 0.92% [1-5]. In the present study, the frequency of ATR was found to be similar with study done by Kumar et al of 0.05% (196 out of 3,80,658) [1]. ATR rate in present study is quite lower than study done by Sharma et al 0.92% (32 of 3,455); Bassi et al 0.40 % (100 of 25,099); Bhattacharya et al 0.35% (105 of 29,720); Pahuja et al 0.19% (314 of 1,60,973) [2-5]. In our study, among all types of reactions, FNHTR 90.62% (29 of 32) is commonest reaction which is higher than that of Bassi et al study 73% (73 of 100); Bhattacharya et al study 58.13% (25 of 43); Pahuja et al study 54.7% (172 of 314); Kumar et al study 35.7% (70 of 196); Sharma et al study 28.1% (9 of 32) [1-5]. In present study, maximum ATR noted with PCV is 87.5% (28 of 32) which is higher than all others authors - Bassi et al study 76% (76 of 100); Sharma et al study 46.87% (15 of 32); Kumar et al study 42.8% (84 of 196); Bhattacharya et al study 37.14% (39 of 105); Pahuja et al study 35.66% (112 of 314) [1-5]. In present study, ATR is more common in female 59.37% (19 of 32) than male 40.62% (13 of 32) which is similar with Sharma et al study in female 59.4% (19 of 32), male 40.6% (13 of 32) [1].

Table 6: Comparison with other studies for discussion.

		Sharma et al (2015)	Bassi et al (2017)	Bhattaharya et al (2011)	Pahuja et al (2017)	Kumar et al (2013)	Our study (2022)
1	Total ATR (%)	0.92	0.40	0.35	0.19	0.05	0.05
2	FNHTR (%)	28.1	73.0	58.13	54.7	35.7	90.62
3	ATR with PCV (%)	46.87	76.0	37.14	35.66	42.8	87.5
4	ATR in Female (%)	59.4	80.0	34.28	46.0	38.77	59.37

Table 7: Comparison with other studies for discussion.



CONCLUSION

In the present study, frequency of Adverse Transfusion Reaction (ATR) is 0.05% (32 of 62,998). ATR are most commonly encountered with PCV and then whole blood (WB). Most common ATR is FNHTR and then acute hemolytic transfusion reactions among all transfusion reactions. ATR is more common in female than male. It is necessary to create awareness among residents, interns and nursing staff to check all clerical work before transfusion. There is need of continuous medical education among clinicians, nursing staff about reporting all ATR immediately.

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