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ORIGINAL RESEARCH

Voluntary blood donation promotion in Haute Matsiatra region of Madagascar

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Abstract

Aims: Access to sufficient, secure supplies of blood and safe transfusion services is an essential part of any strong health system. The Haute Matsiatra region has a need for blood and blood products that exceeds current availability (only 7% of needs are met). The aim of this study is to assess community knowledge, attitude, and practice regarding voluntary blood donation in order to identify the obstacles.

Methods: We have conducted a community-based cross-sectional study from 26th to 31th July 2019 within a sample of 300 subjects using a structured questionnaire and face-to-face interview. Data were analyzed using R software version 4.0.2.

Results: All participants were unanimous about vital role of blood so that 62.3% were willing to donate blood but only 13% have ever donated blood. The majority of respondents (60.0%) had never heard sensitization about blood donation. The reason for non-donation were related to fears of needlestick injuries during the blood collect (38.3%), fear of blood borne diseases (17%), the lack of sensitization (6%). There was a positive significant relationship between level of education and willingness to donate blood (p -value $< 0, 05$). The likelihood of blood donation was found to be higher among male participant 28 (71.8%) $p < 0.05$, and among > 45 years group (21.4 %) $p = 0.03$. Among those who ever donated blood, only 37 (26.6%) of them have received sensitization about donation.

Conclusion: There is growing interest in blood donation among the population. Activities to promote blood volunteer donation should take into account the demotivating reasons for blood donation.

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Introduction

Access to sufficient, secure supplies of blood and safe transfusion services is an essential part of any strong health system (1). Blood transfusions contribute for saving patients whose lives are at risk. They can help patients who have a life-threatening disease, complications during pregnancy and childbirth, severe trauma, surgical procedures. They are also regularly used for patients with hematologic disease such as sickle cell disease, thalassemia and hemophilia (2). Despite advanced research, there is currently no substitute for human blood (3). According to the World Health Organization (WHO), about 118.5 million blood donations are collected around the world, in which 40% are collected in high-income countries, home to 16% of the world's population (4). Unpaid voluntary donors have the lowest rates of transfusion-associated infections and are the ideal population from which to recruit donors as bloods are given for genuine altruistic reasons. Voluntary donors do not have any reason to give false information about lifestyle factors which might place them at risk of transmitting infectious agents. There is therefore a reduced risk of obtaining blood during the 'window' period of HIV infection (5). The WHO's goal is to obtain for each country all their respective blood supplies through voluntary unpaid donors, in accordance with the art 28.72 of World Health Assembly adopted resolution in 1975 (6). In Madagascar, the blood donation rate in 2013 was 1.0 unit per 1000 inhabitants. Among all donors, only 18.6% are voluntary non remunerated (7). The region of Haute Matsiatra, in particular, has a need for blood and blood products that exceeds current availability (only 7 % of needs are met). The voluntary blood donor insufficiency is a major challenge in this area even if information about donation is offered

regularly (16.41% in 2019: Haute Matsiatra region blood bank, unpublished data, 2019). Replacement blood donors recruited by families are the major source of blood in this region. This situation contributes to the persistent high mortality rates associated with potentially reversible conditions such as haemorrhage and anaemia. Factors affecting blood donation often vary in various populations (8) (9). Therefore, better understanding on the level of community knowledge, attitude, and the practice of donors may help to strengthen the blood donation program in this area. In order to identify obstacles to blood donation among the population of Haute Matsiatra region, we have conducted a preliminary survey that aim to assess knowledge, attitude, and practice towards blood donation and its associated factors.

Methods

We implemented a cross-sectional community-based study in the Haute Matsiatra region. Haute Matsiatra is located at 400km from the capital city of Madagascar. Based on Malagasy population and housing census 2019 estimation, the total population of this region was estimated 1 447 296 inhabitants, 189 879 of which are urban populations (10). Multi-stage sampling technique was used to in order to recruit the study participants. On the first stage, 6 fokontany (equivalent of village) were selected from the total of 50 of the region by lottery method. We used then a systematic random sampling technique to select 50 households per fokontany. To select one study participant per household we employed a lottery method. Study population: All adults aged 18 - 65 years residing in Haute Matsiatra region were the source population. They were selected by multi-stage sampling technique and lived in the study area for at least six months

were included. Sample size determination: We calculated the sample size with a single population proportion formula using 95 % CI and 5 % margin of error. The sample size was found to be N=300 after considering a 1.69 % non-response rate. Data processing and analysis: Malagasy structured questionnaire was used to collect the data at each selected household. The tools were developed after reviewing of relevant literatures and adapted to the context of the study area (11). Information on the sociodemographic characteristics (15 questions), knowledge (9 questions), attitude (17 questions), and practice-related questions (12 questions) on blood donation were included. Then, separated face to face interview from questionnaire data were entered into R software version 4.0.2 for univariate and multivariate analysis.

Ethical considerations: The study was approved by an ethics committee. Written informed consent was obtained from all the study participants. They were adequately pre-informed of the aim and the implication of the study and were told about their right to refuse or withdraw their verbal consent to participate in the research. Confidentiality of information was kept including omitting personal identifiers such as the name of the respondent.

Results

Sociodemographic characteristics: From the calculated 305 sample size, 5 subjects recruited was not related to the sample size, 300 participants were involved in the study. A total of 122 (40.7%) participants were in the age group of 18-25 years, more than half 167 (55.7%) were females and 175 (58.3%) were married (**Table 1**).

Table 1: Sociodemographic characteristics of the study participants (n=300)

| Variables | Frequency | Percentage (%) |
|---------------------------|-----------|----------------|
| Age group in years | | |
| 18-25) | 122 | 40,7 |
| 26-35) | 82 | 27,3 |
| 36-45) | 40 | 13,3 |
| > 45 | 56 | 18,7 |
| Gender | | |
| Female | 167 | 55,7 |
| Male | 133 | 44,3 |
| Marital status | | |
| Married | 175 | 58,3 |
| Single | 104 | 34,7 |
| Separated | 11 | 3,7 |
| Widowed | 10 | 3,3 |
| Religion | | |
| Christian | 298 | 99,3 |
| Other | 2 | 0,7 |

| Educational status | | |
|---------------------------|-----|------|
| Illiterate | 15 | 5 |
| Elementary | 101 | 33.7 |
| Secondary | 111 | 37.0 |
| graduated | 73 | 24.3 |
| Occupation sector | | |
| Primary | 152 | 50.7 |
| Secondary | 37 | 12.3 |
| Tertiary* | 111 | 37.0 |

*tertiary sector: commerce, administration, transport, financial and real estate activities, business and personal services, education, health and social work

Knowledge about voluntary blood donation

The majority of respondents 180 (60.0%) had never heard sensitization about blood donation. Mass media was the main source of information of 186 (62.7%) participants. Among the 300 study participants, 263 (87.7%) were affirmed that blood transfusion “can save life”. Only 13 (4.4%) study participants had the right answers concerning minimum criteria for blood donation (age 18-65 years, weight above 45kg, basic good health). Two hundred eighty-seven (95.7%) participants replied that hospital is the only site of blood collection. Digestive hemorrhage, anemia, accident were the main cited indications

of blood transfusion, 69 (23%) participants didn’t have any idea. Two hundred and ten participants (70.0%) replied that donating blood advantages were “to save life”, “to benefit from free analysis”¹² (4.0%), “to earn money”⁶ (2%). Cited disadvantages were 55 (18.4%) “fear of degraded health after donation”, 6 (2.0%) “fear of acquired diseases”, 4 (1.3%) “fear of bloodborne disease”, 3 (1.0%) “fear of anemia”, 1 (0.3%) “fear of sudden death after donation” (**Table 2**).

Table 2: Knowledge about voluntary blood donation (n=300)

| Variables | Frequency | Percentage (%) |
|---|------------------|-----------------------|
| Main cited indications of blood donation | | |
| Digestive hemorrhage | 96 | 32.0 |
| Anemia | 53 | 17.7 |
| Bleeding | 44 | 14.7 |
| Accident injuries | 17 | 5.6 |
| Delivery | 9 | 3.0 |
| Surgical intervention | 12 | 4.0 |
| Do not have any idea | 69 | 23.0 |
| Main cited advantages of blood donation | | |

| | | |
|----------------------------|-----|------|
| Satisfaction saving life | 210 | 70.0 |
| To ameliorate health | 47 | 15.7 |
| Benefit from free analysis | 12 | 4.0 |
| To earn money | 6 | 2.0 |
| No advantages | 25 | 8.3 |

Main cited disadvantages of blood donation

| | | |
|--------------------------------|-----|------|
| Degraded health after donation | 55 | 18.4 |
| Risk of acquired diseases | 6 | 2.0 |
| Blood born infections | 4 | 1.3 |
| Anemia | 3 | 1.0 |
| sudden death after donation | 1 | 0.3 |
| No disadvantages | 214 | 71.3 |
| Do not have any idea | 17 | 5.7 |

Attitude toward voluntary blood donation

Among respondents, 153 (51%) of them approve of voluntary blood donation but only 49 (16.3%) showed their willingness to donate blood in the future if needed (**table 3**). The likelihood of favorable attitudes towards blood donation was higher among male gen-

der (36.3% $p < 0.05$), those who attended secondary school (28 % $p < 0.005$). Media user had higher chance of having favorable attitude compared to other source of information user (42% $p < 0.05$).

About 34.3% of those who had previous sensitization had favorable attitude towards blood donation (**Table 4**).

Table 3: Study participants' attitude toward voluntary blood donation (n=300)

| Variables | Frequency | Percentage (%) |
|--|------------------|-----------------------|
| <i>Do you approve of voluntary blood donation?</i> | | |
| Approve | 153 | 51.0 |
| Strongly approve | 111 | 37.0 |
| disapprove | 18 | 6.0 |
| I do not know | 18 | 6.0 |
| <i>Have you ever been solicited for blood donation ?</i> | | |
| Yes | 49 | 16.3 |
| No | 251 | 83.7 |
| <i>Are you motivated to donate blood for a relative if there is need?</i> | | |
| Yes | 243 | 81.0 |
| No | 57 | 19.0 |
| <i>What reasons could motivate you to blood donation ?</i> | | |

| | | |
|---------------------------------------|-----|------|
| To benefit from free blood tests | 121 | 40.3 |
| Fear of not receiving blood when need | 88 | 29.3 |
| To earn money | 65 | 21.7 |
| To save life | 17 | 5.7 |
| For the maintenance of good health | 9 | 3.0 |

Table 4: Factors associated with the attitudes towards blood donation among participants (N=300)

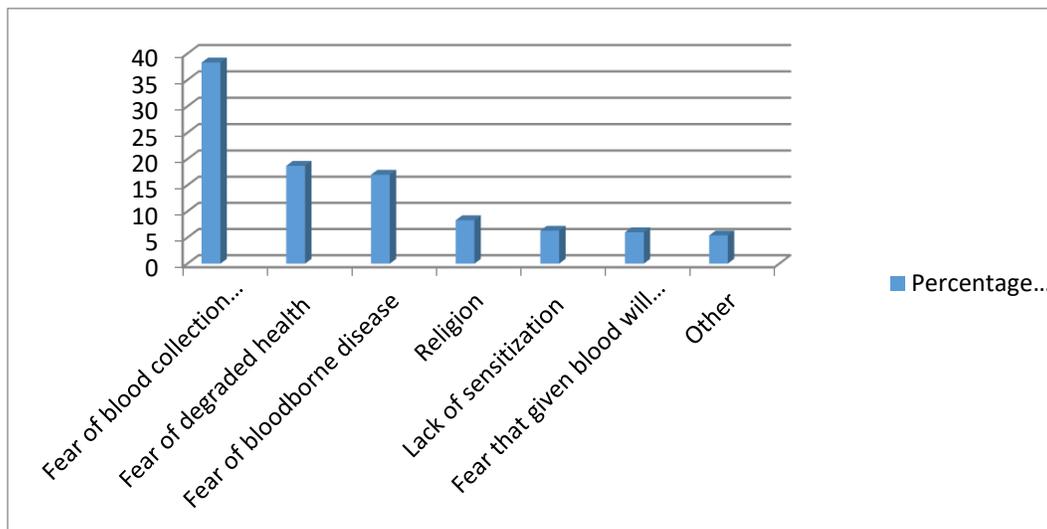
| Variables | Attitude to donate blood | | | | p- value |
|------------------------------|--------------------------|-------|-------------|-------|----------|
| | Favorable | % | Unfavorable | % | |
| Age | | | | | 0.02 |
| 18-25) | 88 | 29.33 | 34 | 11.34 | |
| 26-35) | 48 | 16.00 | 34 | 11.34 | |
| 36-45) | 20 | 6.66 | 20 | 6.66 | |
| > 45 ans | 31 | 10.34 | 25 | 8.33 | |
| Gender | | | | | 0.29 |
| Male | 109 | 36.33 | 58 | 19.33 | |
| Female | 78 | 26.00 | 55 | 18.34 | |
| Occupation sector | | | | | 0.00 |
| Primary | 67 | 22.33 | 85 | 28.34 | |
| Secondary | 31 | 10.33 | 6 | 2.00 | |
| Tertiary | 89 | 29.66 | 22 | 7.34 | |
| Marital status | | | | | 0.00 |
| Married | 90 | 30.00 | 85 | 28.34 | |
| Single | 83 | 27.67 | 21 | 7.00 | |
| Widowed | 8 | 2.67 | 2 | 0.66 | |
| Separated | 6 | 2.00 | 5 | 1.66 | |
| Educational status | | | | | 0.00 |
| Illiterate | 2 | 0.66 | 13 | 4.34 | |
| Elementary | 35 | 11.66 | 66 | 22.00 | |
| Secondary | 84 | 28.00 | 27 | 9.00 | |
| Undergraduate | 66 | 22.00 | 7 | 2.34 | |
| Source of information | | | | | 0.00 |
| Media | 126 | 42.00 | 60 | 20.00 | |
| Medecin | 33 | 11.00 | 4 | 1.34 | |
| Community | 19 | 6.33 | 37 | 12.34 | |

| | | | | |
|-------------------------------|-----|-------|----|-------------|
| Friends | 5 | 1.66 | 5 | 1.66 |
| Other | 4 | 1.33 | 7 | 2.34 |
| Previous sensitization | | | | 0.00 |
| Yes | 103 | 34.33 | 36 | 12.00 |
| No | 84 | 28.00 | 77 | 25.67 |

The mainly cited barriers for blood donation related to fears of needlestick injuries during the blood collect (38.3%), fear of blood-born

diseases (17%), and lack of sensitization (6%) (**Figure 1**).

Figure 1: Main cited barriers for blood donation (n=300)



Practice of blood donation and its associated factors

Total number of participants who have already practiced blood donation was 39 (13 %) from which 22 (56.4 %), 11 (28.2 %), 3 (3%) and 3 (7.7%) have donated respectively once, two, three and more than 3 times. The reasons for donation were to save relative's life 22 (56.4 %), moral duty 7(17.9 %), due to efficient sensitization 6 (15.4 %), to save other peoples' lives 4 (10.3%). Overall, the majority were satisfied with the blood collection session, 6 among 39 felt not reassured.

Significant factors associated to blood donation was age group >35 years (41.4 %): $p=0.02$, male gender, marital status (married status has positive influence). Participants having secondary school level education were more likely (22/39) to donate blood compared to those who have a high degree education: $p=0.04$. Among those who ever donated blood, majority 37 (34.3%) of them have received general sensitization before donation: $p=0.02$ (**Table 5**).

Table 5: Factors associated with practice of blood donation among participants.
(n=300)

| Variables | Have already donated blood | | | p- value |
|-------------------------------|----------------------------|-------|-----|----------|
| | YES | % | NO | % |
| Age | | | | 0.03 |
| 18-25) | 9 | 7.4 | 113 | 92.6 |
| 26-35) | 10 | 12.2 | 72 | 87.8 |
| 36-45) | 8 | 20.0 | 32 | 80 |
| > 45 ans | 12 | 21.4 | 44 | 78.6 |
| Gender | | | | 0.0004 |
| Male | 28 | 21.1 | 105 | 78.9 |
| Female | 11 | 6.60 | 156 | 93.4 |
| Marital status | | | | 0.07 |
| Married | 27 | 15.4 | 148 | 84.6 |
| Single | 8 | 7.7 | 96 | 92.3 |
| Widowed | 3 | 30 | 7 | 70 |
| Separated | 1 | 9.1 | 10 | 90.9 |
| Educationalstatus | | | | 0.04 |
| Illiterate | 0 | 0 | 15 | 100 |
| Elementary | 10 | 9.9 | 91 | 90.1 |
| Secondary | 22 | 19.8 | 89 | 80.2 |
| Undergraduate | 7 | 9.6 | 66 | 90.4 |
| Source of information | | | | 0.01 |
| Media | 29 | 15.6 | 157 | 84.4 |
| Medecin | 3 | 8.1 | 34 | 91.9 |
| Communityworker | 5 | 8.9 | 51 | 91.11 |
| Friends | 0 | 0 | 10 | 100 |
| Others | 0 | 0 | 11 | 100 |
| Previous sensitization | | | | 0.02 |
| Yes | 37 | 34.3 | 102 | 65.7 |
| No | 2 | 28.00 | 159 | 72 |

Discussion

In this study, the overall level of knowledge (about minimum criteria for blood donation) towards blood donation was found to be

much lower than a community based study conducted in the Debre Markos town of Ethiopia (56.5%) (12), in the city of Mekelle (49 %) (13), and another study, conducted among

students of health science in Addis Ababa (83 %)(14). The difference in socio-economic status and in educational status of population might explain the discrepancy with the above findings. This is possible, 'because more educated people might be in a better position to access the media and availability of awareness creation at primary and secondary school and higher educational institutions' (12). Moreover, the majority of respondents had never heard any sensitization about blood donation before the study. Partly, this might be explained by the limitations of awareness campaigns on addressing the intended goals. In addition to individual factors, the characteristics of the collection site - fixed or mobile - are important in explaining variation in donor behavior. Satisfaction with the blood bank opening hours, collection site type, the traveled distance to the medical examination site and blood collection, represent important clues for blood bank policies and interventions to improve donor motivation (15). Television and the internet are the most effective tools for promotion and recruitment for blood donation in Guangzhou China (16). Social media have become the second most important motivation reason to recruit voluntary donor beside relatives and friends. In the study area, Facebook is the preferred social media to transmit and receive information about the blood donation process, however, access to internet is still limited compared with mass media and is not used sufficiently for awareness campaigns. For repeat donors, experience of the last donation process plays a key role, the more it is positive, the more it is motivating for the future (17). Some participants are scared of what they regard as side effects of blood donation. As per a Nigerian study, 36.1% of university graduated donors believe that they can contract Human Immunodeficiency Virus (HIV) and/or hepatitis infection from blood donation (18). It high-

lights the fact that knowledge of blood donation is an essential prerequisite before voluntary blood donation, and it is an important tool for avoiding fear and building positive attitude. Creating awareness on the general public regarding HIV, HBsAg and HCV transmission and prevention should be strengthened (19). The overall intention of respondents to donate blood voluntarily can be due to the malagasy culture (the "fihavanana") of sustaining social relationships and being generous to help anytime anywhere. The findings of this study are consistent with studies across the world, which found overall positive attitudes towards blood donation among respondents(20), (21), (14), (22), (23). Findings were lower in other studies conducted in Karachi (42%) (23), Mekelle (61 %) (13) and Addis Ababa (68 %) due to cultural differences (14). Regarding factors affecting blood donation, a range of socio-demographic, organizational, physiological and psychological may influence people's willingness to donate blood (24). In the current study, factor significantly associated to favorable attitude for blood donation were age group, male gender, media and previous sensitization. Young participants were indeed significantly associated with favorable attitude for voluntary blood donation. This could be due to a large proportion of young adult's state that they are able and willing to donate blood compared with elder one (25). It was also noted that male gender was significantly favorable to blood donation compared with female which is consistent with overall studies across the world (26). This could be in congruent to cultural belief that male is better and stronger to take responsibility than female. Also, women have to face many different temporary restrictions for blood donation because of the menstrual cycle or lactation period (27, 28). Herein, most of donors were satisfied with previous blood collection expe-

rience and felt reassured. Personal blood-donation experience (quality of donor reception, pleasant medical staff, good atmosphere during donation, organization of blood collecting and processing facilities, perceived physical, psychological and social impact) was indeed cited as a significant predictor of behavioral intentions to donate blood. In fact, occurrence of positive experience may make blood donation less frightening and perhaps even attractive. One of the most important incentive for being a donor was also the direct approach by another donor (29). Concerning the frequently cited motivation for blood donation, altruism was not highlighted for males compared with females, but was combined with 'warm glow' in novice males (30). In a sample of primary healthcare users in a Brazilian municipality, fear of blood, vasovagal reactions, and lack of knowledge regarding the donation process were revealed as important barriers to the decision to donate blood (26). The study showed that some of the participants had a history of blood donation which are not permanent as of now. People donate when there is a need related to family member, not because there is need of safe blood in the community. That could be due to the lack of social marketing toward blood donation and periodic sensitization in the study area. According to the study results, the greatest barrier that prevents people from donating blood were fear of needles, degraded health, physical weakness, blood-borne disease, lack of sensitization. While lack of time and fear of blood donation were the main barriers in Saudi Arabia and some developing countries (30). The findings of this study were different to those barriers reported in Gangzhou China which was self-perception of poor health (33.1%) (16). In a Brazilian study, fear of blood, injections or vasovagal reactions, and a lack of knowledge of the donation process were revealed as important barriers to the decision to donate

blood (28). In a qualitative investigation of Indian non-donors living in England, lack of awareness and accessibility were prominent barriers; in contrast, there was a strong preference for donated blood to be distributed within the family, as opposed to unknown recipients (30). Globally, 'the greatest barrier that prevents people from donating is a lack of convenience and a lack of knowledge of the importance of donating' (5, 8). It suggests that an intensive blood donation campaign should be promoted. This would allow people to be well informed, changing the positive attitude of saving life through blood donation to a regular practice.

Recommendations

It is vital to consider, in the light of the predicted shortages in blood supply, methods to maximize donation rates. As per WHO criteria, availability of blood in a country for transfusion should be indicated by 10 blood donations at least per 1000 population (4). In Madagascar, the number of whole blood donations per 1000 population was less than 5 which remains too low to cover the blood requirements. Donations by repeat voluntary non-remunerated blood donor is 13% (4). Promotion of blood voluntary donation should take into account the demotivating reasons for blood donation which calls governmental commitment and required the need to improve research evidence in this area of practice. Particularly, the existence of a data collection and reporting system is an important element of a well-managed nationally coordinated blood transfusion programme. Adequate national data on blood availability and safety allow the area to set priorities and to further strengthen the blood system. It would be suitable to readjust the strategies for implementing the national blood transfusion policy based on the results of the target population survey. It is then necessary to convince non-donors and retain regular volunteer

donors. Consequently, we suggest the following changes:

- Awareness campaigns should focus on strategies to unlock obstacles to donation and insisting on common misconceptions about blood (the belief to a high risk to get infected through the process of donation, blood banks sell donated blood to patients, blood donation believed to cause physical weakness). Some information has to be clarified (the donation process does not spend more than one hours, menstruation is just a temporary contraindication of blood donation).
- Number of mobile collections should be increased to be closer to volunteers (lack of time is sometimes cited as obstacle).
- Use of radio spots, TV spots, telephone messages, leaflets, the press or banners on the Internet, can serve as very good advertising media.
- Guarantee an excellent reception and collection session to avoid negative perception about blood donation process
- Promotion of research in the field of «Knowledge, attitude and practice towards blood donation », « donor sources of

motivation », « blood donation experience ». In fact, having an adequate data on blood availability, safety and a feed-back from donors allow the area to set priorities and to further strengthen the regional blood system.

- Training of medical staff (quality of reception, humanization of care, confidence in donors)
- Implementation of educational programs in terms of educational sessions, media presentations, brochures distribution, and raising awareness of students on blood donation in Haute Matsiatra region.

Conclusion

The study shows positive attitudes and a great interest in blood donation in the Haute Matsiatra region. It has been identified that fear is the most significant barrier to blood donation among the area population. These findings can be a baseline for health care professionals and may contribute to develop an educational platform on blood donation at national levels.

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