



“ASSESSMENT OF KNOWLEDGE AND ATTITUDE REGARDING BLOOD DONATION AMONG B.Sc. NURSING STUDENTS AT GOVT. NURSING COLLEGE G.M.H. REWA.”

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Abstract: Background: Voluntary, non-remunerated blood donation is the foundation of a safe and adequate blood supply, yet the quantity collected in India remains below national need. Health-profession students are a strategic group for building a donor base, but their knowledge of donation is often incomplete.

Objectives: To assess pre-test and post-test knowledge regarding blood donation, to evaluate the effect of a structured teaching programme (STP) on knowledge, and to describe attitude towards blood donation among B.Sc. nursing students.

Methods: A quantitative, one-group pretest–posttest study with a descriptive component was conducted at the Government Nursing College, G.M.H. Rewa, Madhya Pradesh, in February 2023. Sixty students were recruited by non-probability purposive sampling. Data were collected with a structured questionnaire on demographic characteristics and donation history, a 30-item multiple-choice knowledge questionnaire (maximum score 30) and a five-point Likert attitude scale. A 45-minute lecture-cum-discussion STP was delivered between the pre-test and post-test. Data were analysed with frequencies, percentages, means, standard deviations, the paired *t*-test and the chi-square test.

Results: Before the STP, 61.7% (*n* = 37) of students had inadequate knowledge, 21.7% (*n* = 13) moderate and 16.7% (*n* = 10) adequate knowledge. After the STP, no student had inadequate knowledge, 33.3% (*n* = 20) had moderate and 66.7% (*n* = 40) had adequate knowledge. The mean knowledge score increased from 9.97 ± 2.51 to 26.91 ± 3.42 (mean gain 16.94; paired *t* = 30.95, *df* = 59, *p* < 0.001). Overall, 38.3% had never donated blood, and 91% of students held a positive attitude. Post-test knowledge was not significantly associated with the demographic variables studied.

Conclusion: Baseline knowledge of blood donation among nursing students was largely inadequate, although attitudes were favourable. A brief structured teaching programme produced a large improvement in knowledge. Embedding such programmes in the nursing curriculum may help convert favourable attitudes into voluntary donation behaviour. Because the design lacked a control group, these findings should be confirmed in controlled studies.

Keywords: blood donation; knowledge; attitude; nursing students; structured teaching programme; voluntary donors; India

1. Introduction

Blood is a vital tissue for which no substitute exists. Transfusion underpins trauma care, obstetric and surgical practice, the management of cancer and haemoglobinopathies, and organ transplantation, and the demand for blood continues to rise as populations age and clinical procedures advance [1,2]. Because blood cannot be manufactured, its supply depends entirely on donors. The World Health Organization (WHO) and the International Federation of Red Cross and Red Crescent Societies therefore advocate a national blood supply based on voluntary, unpaid donors, and have set out a global framework for action to reach 100% voluntary donation [1]. Voluntary donors are regarded

as the safest source of blood, whereas family-replacement and paid donation are associated with greater risk and are to be phased out [1,3].

India is among the countries that continue to face a gap between the blood required and the blood collected. National estimates indicate a requirement of roughly 12 million units per year against a collection of about 6.8 million units (National AIDS Control Organisation, 2016). A substantial share of donations still comes from replacement donors, and only a small proportion of eligible persons donate regularly [2,3]. Road traffic injuries, obstetric haemorrhage, anaemia and chronic haematological disease all



increase demand, and shortages are felt most acutely in emergencies and in the months when voluntary camps are fewer. Whether a person donates depends on knowledge, attitude and opportunity. Behavioural models such as the theory of planned behaviour hold that attitudes, perceived control and intentions together predict goal-directed behaviour [4]. Knowledge, attitude and practice (KAP) surveys from India, China, Togo, Saudi Arabia and Nigeria describe a consistent pattern: favourable attitudes and stated willingness are common, but actual donation is uncommon, and misconceptions about weakness, anaemia, infection and pain persist [5–10]. Studies among university students identify fear of needles, inconvenience, medical ineligibility and, most often, never having been asked, as the leading barriers [11–13].

Young adults are an especially important target. Those now reaching donation age are the donors of the next several decades, and habits formed early tend to persist. Nursing students deserve particular attention. They will counsel patients and families, take part in donor selection and transfusion care, and influence community opinion. Evidence from Indian health-science students nonetheless suggests that their knowledge is only partial [5,6,9]. A student who understands eligibility criteria, the safety of the procedure and the medical need for blood is better placed both to donate and to dispel myths in others.

Most published studies describe knowledge and attitude at a single point in time. Fewer have examined whether a short, structured educational intervention can improve knowledge in a specific student population in central India. The present study was undertaken to address this gap. Its objectives were: (1) to assess the pre-test and post-test level of knowledge regarding blood donation among B.Sc. nursing students; (2) to determine the effect of a structured teaching programme (STP) on knowledge; and (3) to describe the attitude of these students towards blood donation. The null hypothesis (H_0) was that there is no significant difference between pre-test and post-test mean knowledge scores; the research hypothesis (H_1) was that a significant difference exists.

2. Methods

2.1 Study design and setting

A quantitative approach was adopted. The study used a one-group pretest–posttest (pre-experimental) design to evaluate the effect of the STP on knowledge, combined with a descriptive, cross-sectional assessment of demographic characteristics, donation history and attitude. The conceptual framework followed a system model of input (students, demographic variables and prior donation experience), process (pre-test, STP and post-test) and output (change in knowledge). The study was conducted at the

Government Nursing College attached to G.M.H. Rewa, Madhya Pradesh, India, in February 2023.

2.2 Participants and sampling

The study population comprised B.Sc. nursing students of the college. A total of 60 students were enrolled using non-probability purposive sampling. Students were included if they were willing to participate, able to read and understand Hindi or English, and present on the day of data collection. Students who declined to participate or were absent were excluded. No formal sample-size calculation was performed; the sample size was determined by the available population and the time frame of the study. Selection was therefore non-random, and the sample cannot be assumed to represent all nursing students.

2.3 Instruments

Data were collected with a structured, self-administered tool in three parts. **Part I** recorded socio-demographic characteristics (age group, sex, religion, education), previous blood donation (never, once, twice or more), main source of information about blood donation (television, internet, newspaper, Red Cross) and interest in donating blood (yes or no).

Part II was a structured knowledge questionnaire of 30 multiple-choice items covering the meaning of blood donation, blood groups, donor eligibility (age, weight, haemoglobin and permanent and temporary deferral), the donation interval, the amount of blood collected, where blood can be donated, and the use and safety of donated blood. Each correct answer scored one mark and each incorrect or unanswered item zero, giving a possible range of 0–30. Scores were classified as inadequate (< 50%), moderate (50–75%) or adequate (> 75%). These categories correspond to the poor, average and good bands defined in the study protocol.

Part III was a five-point Likert attitude scale (strongly disagree to strongly agree) with positively and negatively worded statements, adapted from the scale of Manikandan and colleagues [5]. Responses of agree or strongly agree to positive statements, and disagree or strongly disagree to negative statements, were scored as favourable. A total score above the midpoint of the scale was classified as a positive attitude, and a score below it as a negative attitude.

2.4 Validity, reliability and pilot study

Content validity was established through a review of the literature and the opinion of subject experts in nursing, who evaluated the relevance, clarity and sequence of items; the tool was revised according to their suggestions. A pilot study was carried out among six students who met the inclusion criteria and were not part of the main sample, to test feasibility and clarity. Test–retest reliability of



the knowledge questionnaire, calculated with Karl Pearson's correlation coefficient, was $r = 0.97$, indicating high stability. In the pilot, the programme produced a significant gain in knowledge ($t = 5.95$, $p < 0.001$), and the tool and procedure were judged feasible for the main study.

2.5 Intervention: structured teaching programme

The STP was developed from the literature and expert guidance and delivered to the students in a classroom by the investigator as a 45-minute lecture-cum-discussion session. Content included the definition of blood donation, types of donation, the importance of voluntary donation, eligibility criteria and conditions for donation, the volume of blood collected, the donation procedure and post-donation care, the use of blood components, and common myths and misconceptions. Audiovisual aids were used. The lesson plan stated specific objectives for each unit.

2.6 Data collection procedure

Formal permission was obtained from the Principal of the college, and ethical clearance was granted before data collection. Participants were informed of the purpose of the study, and written consent was obtained. Data were collected in February 2023. On the first day, the demographic and attitude tools and the knowledge questionnaire (pre-test) were administered. The STP was then delivered, and the same knowledge questionnaire was readministered as the post-test. Questionnaires were checked for completeness on the day of collection.

2.7 Ethical considerations

Participation was voluntary and participants could withdraw at any time. Confidentiality and anonymity were maintained, no discrimination was made on the basis of caste, sex or religion, and the information was used only for research purposes.

2.8 Data analysis

Data were entered in Microsoft Excel and analysed in SPSS. Categorical variables were summarised as frequencies and percentages, and knowledge scores as means and standard deviations (SD). The difference between pre-test and post-test mean scores was tested with the paired t -test ($df = 59$). Associations between post-test knowledge and selected demographic variables were examined with the chi-square test. The level of significance was set at $p < 0.05$. Mean differences, their 95% confidence interval and a standardised effect size (Cohen's d_z) were calculated from the reported test statistic and are labelled as derived values.

3. Results

3.1 Characteristics of participants

All 60 students completed both the pre-test and the post-test, giving a response rate of 100% (Table 1). Most participants (61.7%) were in the 18–30-year age group, and three-quarters (75.0%) were male. Just over half (51.7%) were Hindu, 25.0% were Muslim and 23.3% were Christian. Graduate-level education was the most frequent category (46.7%). With regard to donation history, 38.3% ($n = 23$) had never donated blood, 25.0% ($n = 15$) had donated once and 36.7% ($n = 22$) had donated twice or more. Television (36.7%) and the internet (33.3%) were the commonest sources of information, followed by newspapers (16.7%) and the Red Cross (13.3%) (Figure 1). Three-quarters of the students (75.0%, $n = 45$) said they were interested in donating blood.

Table 1. Socio-demographic characteristics, donation history and sources of information of the participants ($N = 60$)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18–30	37	61.7
30–40	13	21.7
40–60	10	16.7
Sex		
Male	45	75.0
Female	15	25.0
Religion		
Hindu	31	51.7
Muslim	15	25.0
Christian	14	23.3
Education		
Higher secondary	12	20.0
Graduate	28	46.7
Postgraduate	12	20.0
All of the above	8	13.3
Previous blood donation		
Never	23	38.3
Once	15	25.0
Twice or more	22	36.7



Variable	Frequency (n)	Percentage (%)
Main source of information		
Television	22	36.7
Internet	20	33.3
Newspaper	10	16.7
Red Cross	8	13.3
Interested in donating blood		
Yes	45	75.0
No	15	25.0

Percentages were recalculated from the frequencies and rounded to one decimal place.

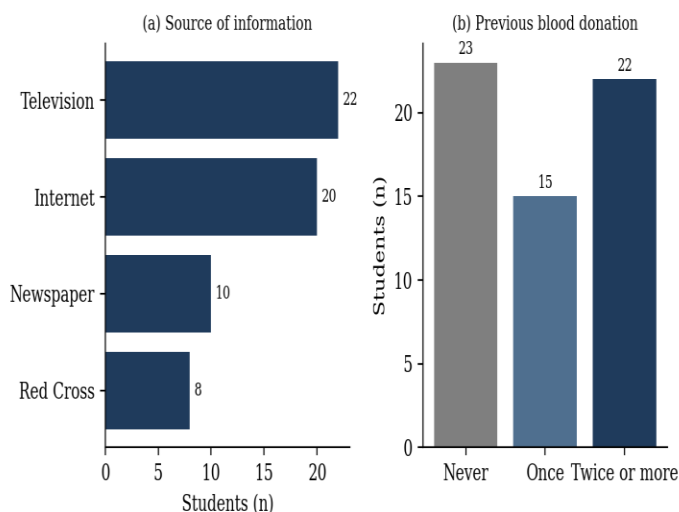


Figure 1. (a) Main source of information about blood donation and (b) previous blood donation among the participants (N = 60).

3.2 Level of knowledge before and after the programme

In the pre-test, 37 students (61.7%) had inadequate knowledge, 13 (21.7%) had moderate knowledge and 10 (16.7%) had adequate knowledge. In the post-test, no student had inadequate knowledge, 20 (33.3%) had moderate knowledge and 40 (66.7%) had adequate knowledge (Table 2, Figure 2). Every student who had inadequate knowledge before the STP moved to a higher category afterwards.

Table 2. Distribution of participants by level of knowledge regarding blood donation, before and after the structured teaching programme (N = 60)

Level of knowledge	Pre-test, n (%)	Post-test, n (%)
Inadequate (< 50%)	37 (61.7)	0 (0.0)
Moderate (50–75%)	13 (21.7)	20 (33.3)
Adequate (> 75%)	10 (16.7)	40 (66.7)
Total	60 (100)	60 (100)

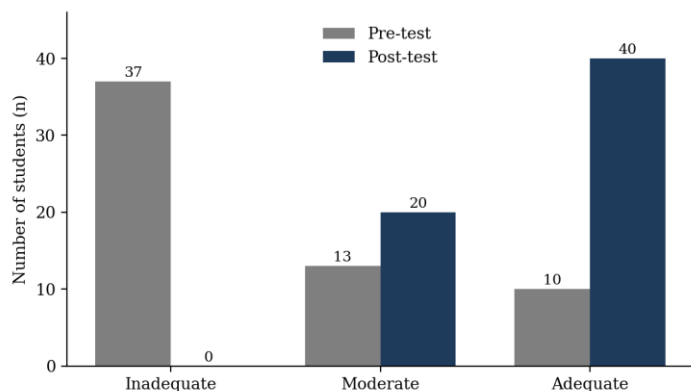


Figure 2. Level of knowledge regarding blood donation before and after the structured teaching programme (N = 60).

3.3 Effect of the structured teaching programme

The mean knowledge score rose from 9.97 (SD 2.51) before the programme to 26.91 (SD 3.42) afterwards, a mean gain of 16.94 points (Table 3, Figure 3). Expressed against the maximum score of 30, mean knowledge increased from 33.2% to 89.7%. The paired *t*-test gave *t* = 30.95 with 59 degrees of freedom, a difference significant at *p* < 0.05 (and well below 0.001). From the reported *t* value, the 95% confidence interval for the mean gain was 15.8 to 18.0 points, and the standardised effect size was very large (*d_z* ≈ 4.0). The null hypothesis was therefore rejected and the research hypothesis accepted.

Table 3. Comparison of mean pre-test and post-test knowledge scores (N = 60)

Measure	Pre-test	Post-test	Mean gain	Paired t-test
Mean score (maximum 30)	9.97	26.91	16.94	<i>t</i> = 30.95
Standard deviation	2.51	3.42	–	df = 59



Measure	Pre-test	Post-test	Mean gain	Paired t-test
Mean score (% of maximum)	33.2	89.7	56.5	$p < 0.05$ (significant)

95% CI of the mean gain (derived from t): 15.8 to 18.0. Cohen's d_z (derived): approximately 4.0.

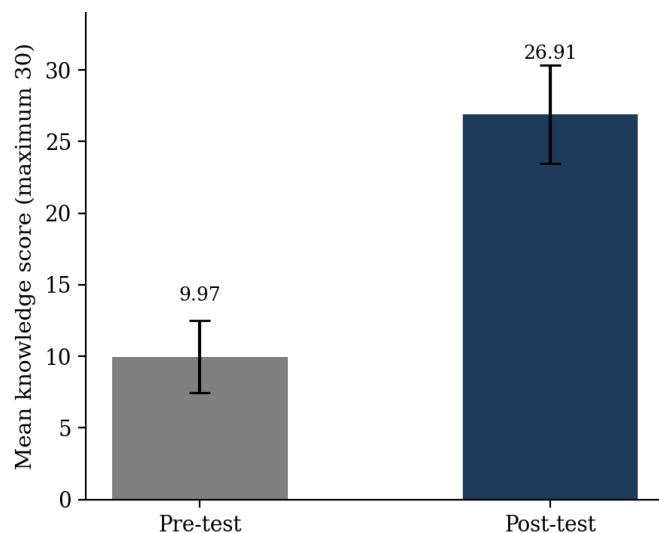


Figure 3. Mean knowledge scores before and after the structured teaching programme. Error bars show one standard deviation.

3.4 Attitude towards blood donation and association with demographic variables

A large majority of the students (91%) had a positive attitude towards blood donation. Although most had a favourable attitude and three-quarters expressed interest in donating, more than a third had never donated, which indicates a gap between attitude and behaviour. Chi-square testing showed no statistically significant association between post-test knowledge and the selected demographic variables.

4. Discussion

This study assessed knowledge and attitude regarding blood donation among B.Sc. nursing students and evaluated the effect of a single STP. The main findings were that baseline knowledge was inadequate in nearly two-thirds of students, that attitudes were overwhelmingly positive, and that a 45-minute structured session was followed by a large, statistically significant gain in knowledge.

4.1 Baseline knowledge

At baseline, 61.7% of students had inadequate knowledge and only 16.7% had adequate knowledge. This pattern echoes surveys

of health-science students in which knowledge was acceptable on general points but weak on specifics. In a study of health-professional students in Chennai, a minority had good overall knowledge [5], and a Nigerian tertiary-institution study likewise found uneven knowledge of donation criteria [9]. Knowledge gaps in the present sample are plausibly concentrated in technical eligibility criteria such as haemoglobin threshold, donation interval and permanent deferral, which are rarely taught explicitly in early nursing courses. The finding supports the premise of the study, namely that nursing students, despite their clinical orientation, hold only partial awareness of donation and need targeted education. The sources of information deserve comment. Television and the internet were the main sources, while the Red Cross, the most authoritative of the four, was named by only 13.3% of students. Dependence on mass and social media may explain the persistence of misconceptions, because such sources rarely convey eligibility rules accurately. Institutional channels, including blood-bank and Red Cross outreach within the college, appear under-used. Differences in the leading information source between studies are common and reflect local media exposure and the activity of blood-donation organisations in the area.

4.2 Attitude and donation behaviour

Ninety-one per cent of students had a positive attitude, in close agreement with a study of undergraduate students in central India, in which about 90% held a positive attitude [6]. Similar findings have been reported from North India, Uttarakhand and elsewhere, where attitudes were favourable while actual donation lagged [7,8]. In our sample, 38.3% had never donated and 75% were interested in donating. These figures suggest that attitude alone does not translate into action. Qualitative and quantitative studies of young non-donors show that donation intentions depend on perceived behavioural control, anticipated fear and discomfort, and above all on being personally asked and given a convenient opportunity [11–13]. The widely reported reason of ‘no one asked me’ implies that organised campaigns on campus could convert a willing but passive group into donors. This is consistent with behavioural models that treat attitude as necessary but not sufficient for behaviour [4].

Importantly, a positive attitude was found alongside low knowledge. Favourable sentiment based on incomplete knowledge is fragile. Students who hold unverified beliefs, for example that donation causes weakness or weight gain, may withdraw once confronted with a real donation opportunity. Correcting knowledge, therefore, is not merely an academic exercise but a practical step in protecting a positive disposition.



4.3 Effect of the structured teaching programme

The most notable result was the gain in mean score from 9.97 to 26.91, equivalent to a rise from about one-third to nearly nine-tenths of the maximum score, and the complete disappearance of the inadequate category after the programme. The change was statistically significant and large in magnitude. Several features of the intervention may have contributed. The content was concise and targeted at the very items assessed, the lecture-cum-discussion format allowed questions and correction of myths, and the audience, being nursing students, had the background to assimilate technical material quickly. The consistency of the pilot result ($t = 5.95$) and the high test-retest reliability ($r = 0.97$) add some confidence that the instrument measured knowledge reliably. The size of the gain must nonetheless be interpreted with caution. The post-test used the same questionnaire as the pre-test and was administered shortly after teaching, so part of the improvement may reflect recall of the specific items, familiarity with the test and the immediacy of instruction rather than durable learning. There was no control group, so maturation, testing effects and other concurrent influences cannot be excluded. The observed effect describes short-term knowledge acquisition and does not demonstrate lasting retention or any change in behaviour. A controlled design with a delayed post-test is required to establish both.

4.4 Association with demographic variables

Post-test knowledge was not significantly associated with demographic variables. A similar absence of association between demographic characteristics and knowledge was reported among Thai university students [10]. A plausible explanation is that a uniform educational exposure raised the scores of all subgroups to a similar level, leaving little room for demographic differences to appear. A second possibility is limited statistical power, since 60 participants spread across several categories give small cells for chi-square testing. Studies with larger samples are needed to test for subgroup differences properly.

4.5 Strengths and limitations

Strengths of the study include a 100% response rate, a pilot-tested and expert-validated instrument with high test-retest reliability, a standardised intervention delivered by one investigator, and the combination of knowledge, attitude and donation-history data in the same group. Several limitations should be noted. The sample was small, drawn from a single college and selected purposively, so selection bias is possible and the findings cannot be generalised to other institutions or regions. The one-group pretest-posttest design has no control group, and the immediate post-test cannot

show retention. Knowledge was measured with a self-administered tool, and attitude and donation history were self-reported and therefore open to social desirability bias. The demographic categories used for age and education were broad and, as recorded, included age bands that are atypical for undergraduate nursing students, which may limit the interpretation of subgroup analyses. Finally, the inferential analysis of attitude was limited to a descriptive summary.

4.6 Implications

For nursing education, the findings support including a short, structured module on blood donation, with emphasis on eligibility criteria, safety and myths, early in the curriculum, since students will later act as educators and role models. For service organisations, the low contribution of the Red Cross as a source of information indicates scope for collaboration between blood banks and nursing colleges, including on-campus awareness sessions and regular donation camps. For research, this study provides baseline data from central India and a validated tool that can be reused in larger, controlled evaluations.

4.7 Recommendations for practice and future research

Three recommendations follow from these findings. First, nursing colleges should consider adding a brief, structured blood-donation module to the first-year curriculum and reinforcing it with periodic refreshers, so that gains in knowledge are maintained. Second, colleges and blood banks should jointly organise awareness sessions and voluntary donation camps on campus, because the most commonly reported reason for not donating in other settings, namely that no one had asked, can be addressed directly through such drives [8,15]. Third, future studies should use larger, multi-centre samples, a randomised or comparison-group design, alternate forms of the knowledge test, and a delayed post-test at several weeks or months, and should record actual donation behaviour so that the effect of education on practice can be measured rather than assumed.

5. Conclusion

Nursing students in this sample held predominantly positive attitudes towards blood donation but had inadequate baseline knowledge, and more than a third had never donated. A single 45-minute structured teaching programme was followed by a large and statistically significant improvement in knowledge, with a mean gain of nearly 17 points on a 30-point scale. The result indicates that brief, well-structured education can rapidly correct knowledge deficits in this group. Because the study lacked a control group and measured only immediate outcomes, the findings are preliminary. Future research should use larger, randomised or controlled



designs, include delayed follow-up to assess retention, and measure actual donation behaviour. Educational programmes, combined with accessible donation opportunities, can help convert favourable attitudes into the voluntary, regular donation on which a safe national blood supply depends.

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Declarations

Ethics approval and consent: Formal permission was obtained from the Principal of the institution and ethical clearance was granted before data collection; informed consent was obtained from all participants. **Funding:** Self-Funded. **Conflict of interest:** No conflict of interest. **Data availability:** The anonymised master sheets are available from the corresponding author on reasonable request.

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