

Original article

Knowledge, Attitudes and Practices on Dietary Supplements among Allied Health Sciences Undergraduates of Sri Lanka

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ABSTRACT

According to research conducted in foreign countries among undergraduates, there is a huge consumption of dietary supplements without proper consultation, and many have encountered adverse effects. However, there have been no satisfactory research studies done on dietary supplement usage among Allied Health Sciences undergraduates in Sri Lanka. The objective of the study was to describe knowledge, attitudes, and practices of dietary supplement usage among Allied Health Sciences undergraduates in Sri Lanka. In this descriptive cross-sectional study, a sample taken from a population of 2000 undergraduates of five Allied Health Sciences faculties in Sri Lanka were assessed using a structured, self-administered questionnaire during the period from March 2021 to June 2022. Stratified random sampling was used to select participants from each department using population proportion and finalized by using simple random sampling with 354 respondents as the sample size. According to the results obtained, the overall prevalence of dietary supplement usage was 63.8%. Of the individuals who used dietary supplements, 97.3% were female and 2.7% were male. The most common reason for using dietary supplements (91.2%) was to compensate for the lack of nutrients in the diet. Multivitamins and minerals were the most frequently reported supplements (86.7%), followed by fish oil (84.5%), beauty ingredients added supplements (77.4%), weight loss supplements (75.2%), and protein/amino acids (70.4%). Among undergraduates, there was widespread use of internet-driven, self-

prescribed dietary supplements intake (95.1%). A significant number of undergraduates took dietary advice from their family members (79.2%). Only 67.3% asked for medical advice from physicians, pharmacists, and dietitians. In conclusion, prevalence of dietary supplement consumption among participants is high (63.8%) but most of were not confident enough to recommend supplements to others (75.7%). Furthermore, side effects among consumers were minimum (4.9%) and most of them obtained the desired benefit. This study can be used to provide background knowledge for future researchers.

Index Terms: Allied Health Sciences, Undergraduates, Dietary supplements, Knowledge, Attitude & Practices

INTRODUCTION

Nutrients play a vital role in metabolism. A balanced diet is defined as selecting food that provides the nutrients needed to maintain the body functions (Krans, 2020). Nutrients are categorized into two groups, macronutrients, and micronutrients, according to the quantity of consumption (Nall, 2009). Macronutrients such as carbohydrates and proteins are obtained in the body in large quantities, whereas micronutrients such as vitamins and minerals are obtained in small quantities (Krans, 2020).

It has been observed that people are not getting enough nutrients from their regular diet due to unhealthy food habits like consuming junk food, processed food, and sugary carbonated beverages. This can lead to nutrient and vitamin deficiencies (Fuhrman, 2018). A dietary supplement is defined as a tablet, aqueous solution, extraction, or powdered version of a substitute for essential nutrients that incorporate one or more varieties of vitamins, plant-based constituents, proteins, amino acids, minerals, and food substances (U.S Food and Drug Administration, 2017). The most common reason for using a dietary supplement is to maintain the health and wellness of the body through which people are expected to boost immunity and energy (Barnes, et al, 2016), (Dickinson, et al, 2014). In addition, people thought that supplements might help to fill the nutrient gaps in the diet, maintain the health of the heart, bones, eyes, and digestive tract and reduce the risk of adverse reactions (Dickinson, et al, 2014). Further, some people use dietary supplements to enhance the beauty of skin, hair, and nails and to aid in antiaging (Dickinson, et al, 2014). Apart from these, dietary supplements can be used to maintain weight and build muscle mass as well as for stress management (Barnes, et al, 2016), (Dickinson, et al, 2014). Considering these facts, the motivation of using dietary supplements is to reduce the vulnerability to face diseases, maintain body functions without difficulties and avert the deficiency problems of nutrients (Attlee, et al, 2017). Data from several research studies concluded that usage of dietary supplements could influence marital status, insecurities of the body, media, and colleagues (Attlee, et al, 2017), (Ardalani, et al, 2016). Further, previous research studies emphasized that usage of dietary supplements is directly influenced by education level, age, gender, financial status, physical activity level, health situation and body mass index (Barnes, et al, 2016). In addition, these research studies have determined that the tendency to use dietary supplements is higher in females than males. Moreover, people with average salaries and educated people are highly consumed dietary supplements (Ardalani, et al, 2016), (Barnes, et al, 2016). Rarely, race and ethnicity have also influenced the consumption of dietary supplements (Satia – Abouta, et al, 2003). Even though, there were many research studies conducted in other countries in the world,

there has been no satisfactory amount of research studies conducted on dietary supplements among Allied Health Sciences (AHS) undergraduates in Sri Lanka. There has only been one significant study about dietary supplements conducted about the consumption of dietary supplements among national-level athletes in Sri Lanka (De Silva, et al, 2010). In addition, there is a lack of knowledge about how nutritional supplement usage could be an effect of social trends. Furthermore, there is an absence of knowledge about what exactly a dietary supplement is, why it is needed, and the likelihood of side effects. Previous research studies indicated that many had encountered adverse effects after the usage of dietary supplements (De Silva, et al, 2010). Therefore, the aim of this research was to identify if AHS undergraduates have encountered adverse effects or whether they have benefitted from the consumption of dietary supplements.

The objective of this research was to determine the knowledge, attitude, and practices of dietary supplement usage among AHS undergraduates in Sri Lanka. Moreover this study will be beneficial to fill the gap between dietary supplement usages among Sri Lankan population and look forward to increasing the awareness of dietary supplements among the young generation in Sri Lanka.

RESEARCH METHODOLOGY

A descriptive cross-sectional study was conducted among AHS undergraduates in University of Peradeniya, University of Sri Jayewardenepura, University of Ruhuna, University of Jaffna and Kotelawala Defense University. The participants below the age of 18 were excluded from this study. Only the participants who gave the informed consent were included in this study. The total population of AHS undergraduates in Sri Lanka in the year 2021 was 2000. Based on this value, the sample size was determined using the “single population proportion formula” (Krejcie and Morgan, 1970) and the sample size was calculated using the “Krejcie and Morgan” formula published by the National Education Association Research Bulletin University of Minnesota (Small sample techniques & The NEA Research Bulletin, 1960).

$$S = \frac{X^2 NP}{d^2 (N - 1) + X^2 P (1 - P)}$$

S= required sample size

X² = the table value of chi square for one degree of freedom at the desired confident level of 95% (95% = 1.96 * 1.96 = 3.841)

N = the population size

P = the population proportion (assumed to be 0.50 Since this would provide the maximum sample Size) 50%

d =the degree of accuracy expressed as a Proportion (0.05)

According to the single population proportion formula, the calculated sample size was 354.

The questionnaire was prepared referring to previous research. A pilot study was carried out to evaluate the validity and reliability of the questionnaire. In the pilot study the questionnaire sent to 20 colleagues of CINEC Campus, Malabe to pre-test and validate the questionnaire. The pre-tested validated questionnaire was sent to all the AHS faculties in selected universities as a google form in three languages: Sinhala, Tamil, and English (Loya, *et al*, 2009), (Snyder, *et al*, 2009), (Owens, *et al*, 2014), (Alhomoud, *et al*, 2016). The results of pilot study were not taken into an account when analyzing the data. Data were analyzed using IBM SPSS (Statistical Package for the Social Sciences), statistical version 21.

RESULTS

The prevalence of dietary supplement consumption is 63.80%.

Female	Male
97.3%	2.7%

Table 1: Gender composition

Most of the participants were female.

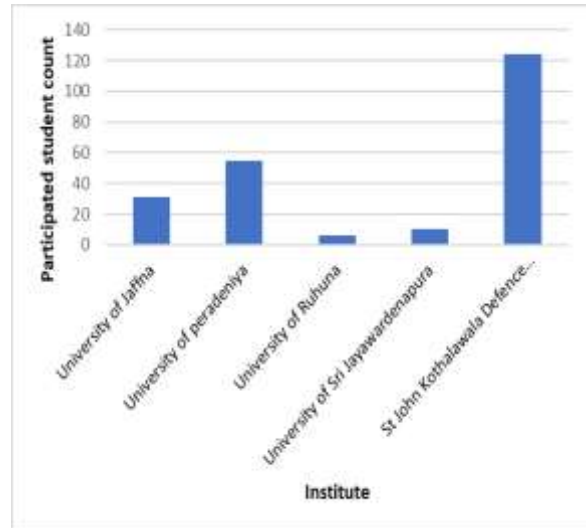


Figure 1: Participated undergraduates count from the institutes.

Questions	Responses	
	Yes	No
Define dietary supplement	98.7%	1.3%
Do you think the use of dietary supplement is always safe?	5.3%	94.7%
Do you think that taking medicines, food or drinks with dietary supplements might interact with each other?	95.6%	4.4%

Table 2: Knowledge regarding dietary supplements.

Questions	Responses	
	Yes	No
Have you attended any Health campaign/workshop on dietary supplement?	7.1%	92.9%
Do you always look for a professional medical help, when taking dietary supplement?	10.2%	89.8%

Table 3: Attitudes regarding dietary supplements.

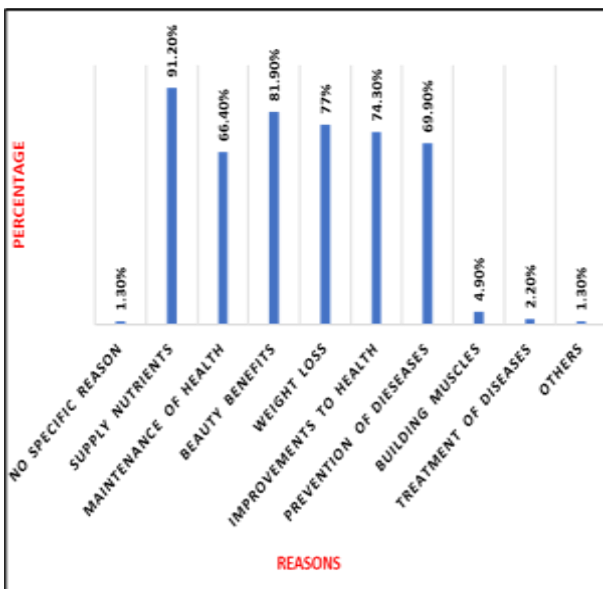


Figure 2: Reasons for consumption of dietary supplements.

The most frequent reason of using dietary supplements was to supply nutrients (91.20%).

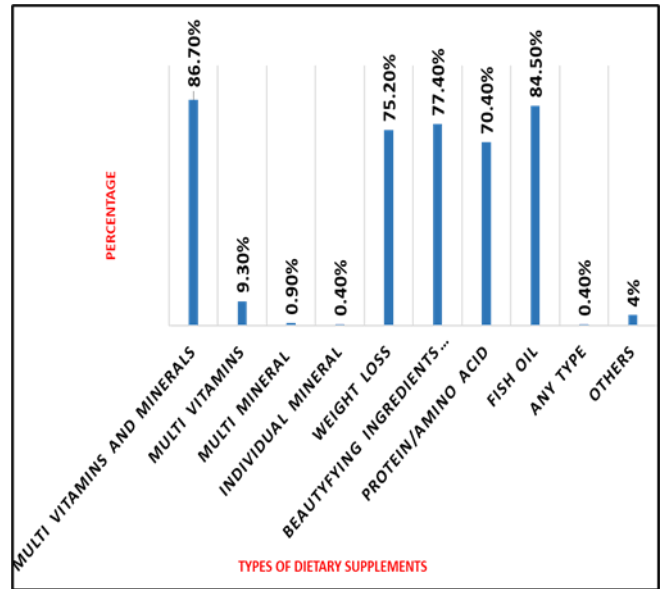


Figure 3: Types of consumed dietary supplements.

Figure 3 demonstrated that multi-vitamins and minerals (86.70%) as the most consumed.

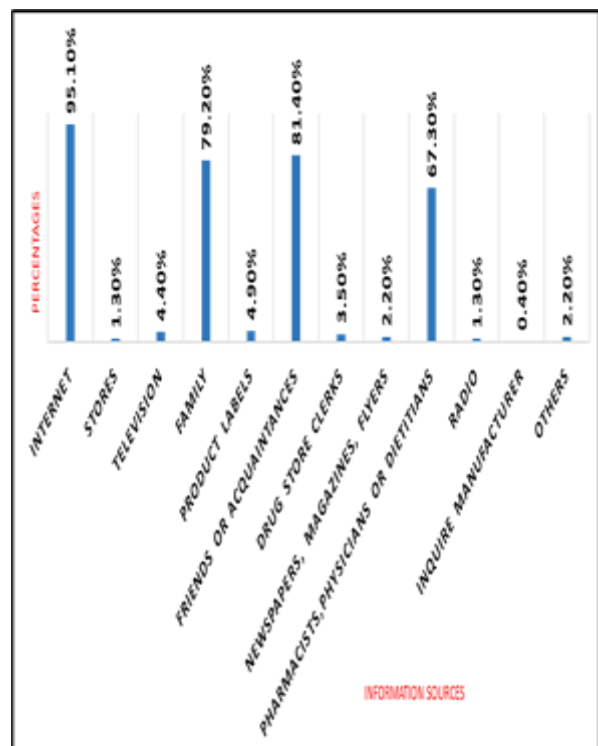


Figure 4: Information sources.

The Internet was the most used source to gather information about dietary supplements (95.10%).

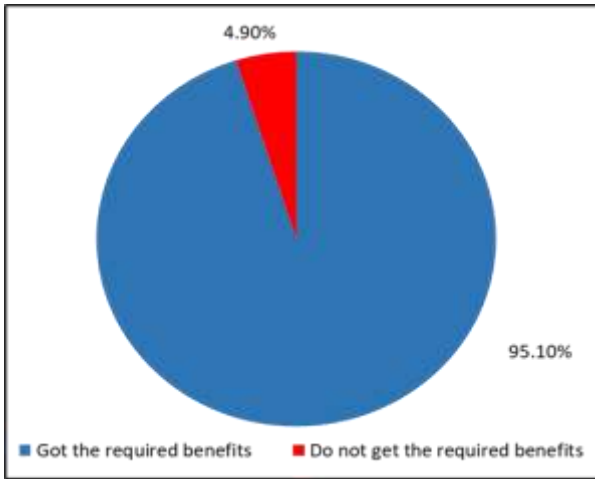


Figure 5: Percentage of obtaining benefits after consumption of dietary supplements.

According to this, 95.10% users got the required benefits from the consumption of dietary supplements.

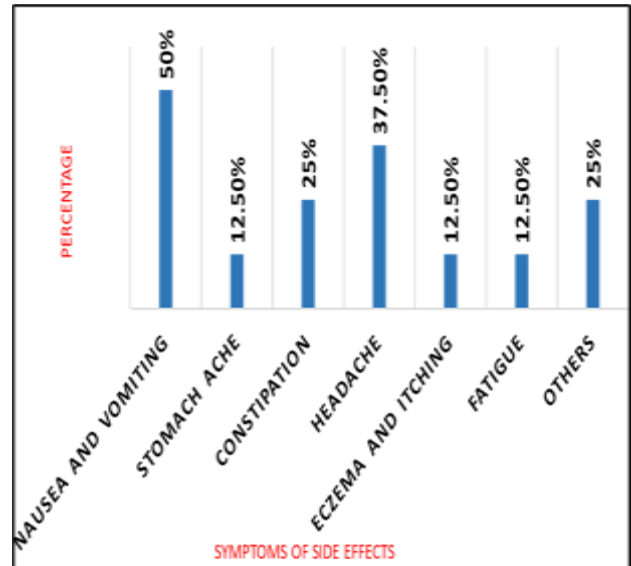


Figure 7: Symptoms of side effects.

According to the graph, nausea and vomiting were the frequent symptom among participants who had experienced side effects (50%) followed by, headache (37.50%), constipation (25%). Furthermore, stomachache, eczema, itching, and fatigue got similar percentages of responses (12.50%).

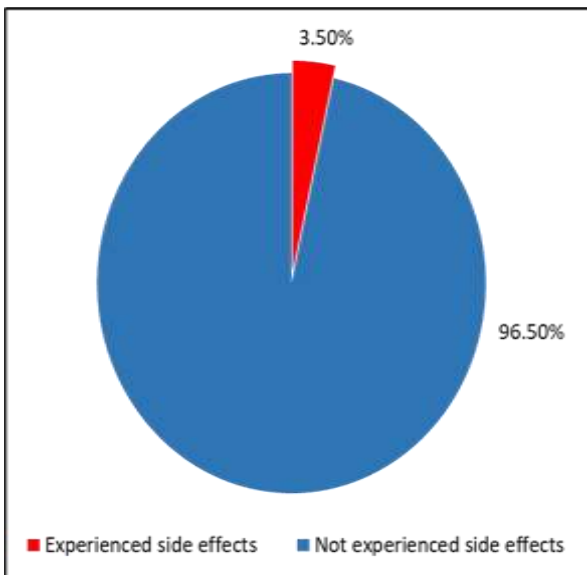


Figure 6: Occurrence of side effects after consumption of dietary supplements.

The percentage of 96.50% of participants were not experienced side effects.

DISCUSSION AND CONCLUSION

According to the results obtained, the overall prevalence of dietary supplement usage was 63.8%. Of the individuals who used dietary supplements, 97.3% were female and 2.7% were male. The most common reason for using dietary supplements (91.2%) was to compensate for the lack of nutrients in the diet. Multivitamins and minerals were the most frequently reported supplements (86.7%), followed by fish oil (84.5%), beauty ingredients added supplements (77.4%), weight loss supplements (75.2%), and protein/amino acids (70.4%). Among undergraduates, there was widespread use of internet-driven, self-prescribed dietary supplements intake (95.1%). A significant number of undergraduates took dietary advice from their family members (79.2%). Only 67.3% asked for medical advice from physicians, pharmacists, and dietitians.

Consonance with the research studies done overseas within past ten years, it has been found out that the prevalence of dietary supplements among university students is high. For an example, the general prevalence of dietary supplements among university students at Princess Nourah Bint Abdulrahman University in Riyadh was 89.8% (Al-Tamimi, 2019). The prevalence of dietary supplements obtained in this research study was 63.80%. A similar prevalence has been reported in the study conducted among university students at Ardabil University of medical Sciences, Iran which was 66.8% (Ardalani, *et al*, 2016). In addition, the prevalence of dietary supplements usage among gender was evaluated in a study conducted at Pharmacy Colleges in the City of Karachi, Pakistan. According to that research findings, the prevalence of 51% was reported in male students and 47.3% was reported in females. Further, it has been reported that usage of dietary supplements was more prevalent in postgraduate students (65.33%) and students of private-sector universities (51.26%) (Naqvi *et al* 2011). However, due to a lack of research on this topic in Sri Lanka, difficulties were encountered when comparing the prevalence of dietary supplements among undergraduate in a national perspective.

Considering the knowledge about dietary supplements most of the participants were aware about dietary supplements and 94.7% agree with the statement the dietary supplements are always safe to use. Comparing with the (Hoover, *et al* 2017) it also mentioned that more than 40% of dental students in University of Saskatchewan strongly agree with the statement, dietary supplements are generally harmless.

It could be seen that the participants who seek professional advice before using a dietary supplement is less. Only 10.2% of participants are looking forward to the guidance of health care professionals when consuming dietary supplements. When considering with the Canadian study done in 2017 (Hoover, *et al*, 2017) it stated that approximately 39% of participants seek professional advice when consuming dietary supplements.

According to a study conducted in Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia, most common reason mentioned for using

dietary supplement was maintenance of general health and well-being (Naqvi *et al*, 2018). Based on study conducted in prince Naurah Bint Abdulrahman University in Riyadh, Saudi Arabia, participants reported that taking supplements for mainly aesthetic reasons (45.6%), such as improving their skin and hair second common reason was health improvement and increased immunity (42.4%) (AlTamimi, 2019). considering research conducted among dental students in Canada, it also proved that most participants took supplements to maintain good health (65%) and to ensure proper nutrition (58 %) (Hoover, *et al*, 2017). In our study denoted that common reason for using dietary supplement was supply nutrients to the body 91.20% followed by, beauty benefits (81.90%), weight loss (77%), improvements to health (74.30%), prevention of diseases (69.90%) and maintenance of health (66.40%). Since this question had the option to choose multiple choices to select reason for using dietary supplements, the total percentage count was not equal to 100%. Therefore, it can be considered that the participants use dietary supplements for multiple reasons.

The results of this research study were like the research conducted in Czech Republic. That showed male respondents of that study preferred mainly vitamins (80.6%), minerals (73.9%) (Chaloupkava, *et al*, 2020). According to this study it has showed that multi vitamins and minerals (86.70%) as the most consumed type of dietary supplements. In addition, research studies conducted in Saudi Arabia denoted the same results as multi vitamins were the most consumed type of dietary supplements (Naqvi *et al*, 2018) Considering the research conducted in Czech Republic to the preferences for sources of information gathered on Dietary supplements were the internet (73%), followed by friends/colleagues (38%), family (33%) and the pharmacy (33%) (Chaloupkava, *et al*, 2020). This study also showed that common source of information on dietary supplement was the internet (95.1%) According to research conducted in Poland Participants were had more confidence toward these over the counter (OTC) medicines or dietary supplements, which were advertised in media. From the participants who responded, 33% studied relating to human health, metabolism, structure, and functioning of living

organisms and 66% showed by students who study other subjects (Bochenek, *et al*, 2020).

Considering research conducted in Saudi Arabia it was determined that the greatest amount of information was provided by friends and relatives (45.3%), and the lowest amount by personal information (15.1%) (AlTamimi, 2019).

According to the research conducted in Italy, 84.6% participants benefited with dietary supplements (Del Balzo, *et al*, 2014). Also, a study conducted in Pakistan denoted that 24.6% participants affected adverse effects and 75.4% participants did not affect with any adverse effects (Naqvi, *et al*, 2018). In this study stated that 96.5 % of participants did not experience any side effects due to dietary supplements usage and only encountered 3.5% of participants with side effects. It is like the results obtain from the research study conducted in Japan. It mentioned that 92.5% participants never experienced side effects and 7.5% participants encountered the side effects (Kobayashi, *et al*, 2017). Considering the symptoms of side effects, Pakistan study showed that mostly encountered side effect was nausea, vomiting and diarrhea (19%) (Naqvi, *et al*, 2018). A Japanese study mentioned that mostly occurred side effect was diarrhea (33.8%), followed by nausea and vomiting (25.3%) with minor percentages of headache (12.3%) and eczema (10.4%) (Kobayashi, *et al*, 2017). These results are quite like the current study, where the most occurring side effects obtained as nausea and vomiting (50%), followed by, headache (37.50%), constipation (25%). Furthermore, stomachache, eczema, itching, and fatigue got similar percentages of responses (12.50%). According to the study conducted in Saudi Arabia most students mentioned that they would recommend dietary supplements only upon a physician's recommendation (65%), 14% of participants always recommended the dietary supplement usage and 20.9% do not recommend dietary supplement usage (Naqvi, *et al*, 2018). In addition, the study conducted in Pakistan showed that 61.3% recommends dietary supplements when physician recommended, 28.9% always recommend the dietary supplements and 9.8% do not recommend dietary supplements (Naqvi, *et al*, 2018). But in this study, obtained results were contradicted with the results of previous studies due to obtained with that most

of the participants did not have definite idea about recommendation of dietary supplements (75.70%).

In conclusion although, most of the participants used dietary supplements, they were not confident enough to recommend supplements for others. Furthermore, side effects among undergraduates were minimum. Since this research study was done on analysing dietary supplements usage among undergraduates in Sri Lanka, there is still some age groups which we did not considered in this study. Therefore, it is recommended to carry out research to analyse the consumption of dietary supplements in other age groups and among postgraduate students. In addition, there is not any regulation on dietary supplements by the Food and drug administration (FDA) for safety or efficacy before releasing to the public. Same can be said about the National Medicine Regulatory Authority of (NMRA) Sri Lanka. Since some dietary supplements may have active ingredients which can interfere with medical conditions, it is recommended to implement a proper regulation on dietary supplements.

DECLARATIONS

A. *Study limitations*

The study surveyed undergraduates in the Allied Health Sciences faculties in Sri Lanka. Therefore, could not be assumed to represent other undergraduates in Sri Lanka. Furthermore, self-reported responses were subjected to reporting bias and error, which may result in over or underreporting due to question misinterpretation.

B. *Acknowledgements*

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C. *Funding sources if any*

None.

D. Conflict of interest

The authors declare that there is not any conflict of interests.

E. Human and Animal related study

None

F. Ethical approval

This study was conducted after obtaining the ethical approval from the Ethical Review Committee of CINEC Campus, Malabe.

G. Informed consent

The purpose of the study and their participation in it were clearly stated prior to obtaining each volunteer's consent.

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