

Study on Knowledge and Acceptability of Custom Implants Manufactured by Selective Laser Sintering Method from Biocompatible Materials with Human Body

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ABSTRACT

Custom implants from biocompatible materials represent a viable alternative to medical devices currently used in the healthcare system. The survey based on an original questionnaire has tested the knowledge level and acceptability of the population regarding the use of customized implants.

The study showed a relatively good level of public knowledge regarding the existence of customized implants from biocompatible materials, the acceptability of their use was high, the main sources of information were the specialist and the family physicians.

The motivations of choosing to perform surgery in Romania's hospitals were different depending on the category of subjects surveyed (medicine students or the general population).

KEYWORDS: *biocompatible material, custom implant, marketing research*

1. INTRODUCTION

In the last years in all medical specialties, including orthopedics, plastic surgery, ophthalmology, maxillofacial surgery, cardiology, urology and neurology biomaterials are used for diagnostic, prevention and therapy

Custom implants manufactured based on anatomy characteristics of each patient that are manufactured from biocompatible materials with human body through selective laser sintering technology represents, currently, new opportunities and modern alternative in surgical solving of trauma, tumors, bone malformation and chronic degenerative pathology of the osteoarticular apparatus.

Marketing should be understood as a tool to meet the needs of customers, selling and advertising representing only the tip of the iceberg. Together they merge in the social field to build relationships with customers, who have as a feedback, the profit.

Double purpose of marketing is to attract new customers by promising a superior value and preserve or increase the number of customers by meeting very appropriately their expectations. Thus, marketing must reach the performance to know the client and the service / product to be suitable for him so that he may "sell itself" [1].

The marketing process involves, [2] knowledge of the market, of the needs and wishes of consumers, developing a marketing strategy focused on customers, developing a marketing

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program that aim to create a higher value, building a strong relationship with customers and their satisfaction, obtaining value from customers in order to create profits and quality for consumers.

Marketing system created and applied in developed countries, with particularly positive results in raising the living standards, is expanding in recent decades also in the rest of the world [3, 5]. Marketing affects everyone, but in different ways, thus creating a conflict of interest between consumers and producers and public groups, which can be overcome if the marketing system will be able to achieve four objectives: maximizing the consumption, the consumer's satisfaction, the consumer's choice and quality of life. These objectives are interrelated, and by combining them is obtained maximize results [5].

2. MATERIAL AND METHOD

The current research was conducted through a questionnaire for collecting data in order to achieve the survey regarding the level of knowledge of population and their acceptability of custom implants made by selective laser sintering of biocompatible materials with the human body. The original questionnaire was developed based on a series of hypotheses set out in the preliminary investigation and was pre-tested on a pilot sample of 5 subjects who were not included in subsequent research, following the methodology of scientific research.

After pretest period, the questionnaire was validated and developed the final form, which was applied by full investigation on two series of students in final year from the faculty of Medicine (total 116 respondents).

Also, the questionnaire was applied in two family medicine cabinets to test level of information and acceptability of potential patients regarding the use of a custom implant. Thus data collecting was done by self registration upon presentation at the medical center of the first 100 patients who accessed health services in one week.

Ethical principles of scientific research were respected, including the anonymous character. Previously the consent of the insured and that of the students to participate in the study was obtained.

As there was done also in other researches, [4], databases achieved in "EXCEL" program were processed by Statistical and Mathematical Methods.

3. RESULTS AND DISCUSSIONS

Over half of the patients from the study group belong to male subjects aged between 35-65 years and over, mostly from urban areas with a higher average educational level and over two thirds having monthly earnings between 800 and 1600 lei.

The majority of students from the study belong to females under the age of 35 years, mainly from urban areas and most with monthly earnings of 800 lei.

More than half of surveyed patients (54.00%) and over three quarters of students enrolled in research (77.59%) declare that they have knowledge about the existence of customized implants. (Fig. 1).

It can be noted the difference between the percentage of responses of medical students, which shows that only 22.41% say they have not heard about the existence of customized implants, possible response motivated by the knowledge from the specific university training compared to the share of 46, 00% of the responses of potential users registered to family physicians from the two cabinets taken into the study.

A possible explanation of this distribution of responses to potential users may be the heterogeneous structure of participants in the study, the different health culture, restricted access

to the new world of scientific research results and accidental contact with the new product - custom implant of biocompatible materials - just in time where there is a need for surgery on a personal level.

Because, in this research, an original work questionnaire was applied, in literature consulted have not found studies that address the issues studied in this manner, so there is no comparative data with the results obtained from the original questionnaire. In the future, further studies that will be performed using this questionnaire will allow to obtain comparative results for the level of information of population (potential users) regarding the existence and usefulness of customized implants made of biocompatible with the human body.

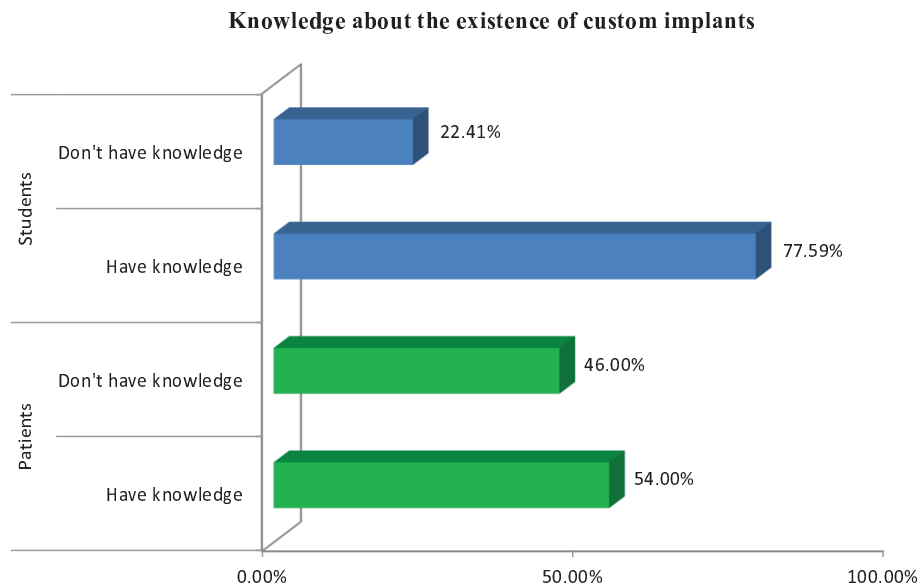


Fig. 1. The share of respondents answers depending of their knowledge, regarding the existence of the customized implants

When respondents were questioned about the intention to use a custom implant of biocompatible materials with the human body in case of malformation type disorders, bone tumor or injury that requires surgery with implant, nearly half of the students investigated, they answered, "Sure Yes " the remaining 54.31% expressed some uncertainty in their responses.

The existence of responses that say they are not totally decided to the use of a custom implant from biocompatible materials, do not entirely exclude the decision to resort to such a product.

Patients gave different answers than students and they expressed their definite intention to use a custom implant from biocompatible material in proportion 46.00% of the responses.

The uncertainty in using this type of implant is declared by over 54.00% of respondents, a possible explanation for these shares being the lack of information and understanding of the new concept.

It must be mentioned that there is no study participant (patient or student) who certainly reject the possibility of using custom implants made of biocompatible materials (Fig. 2).

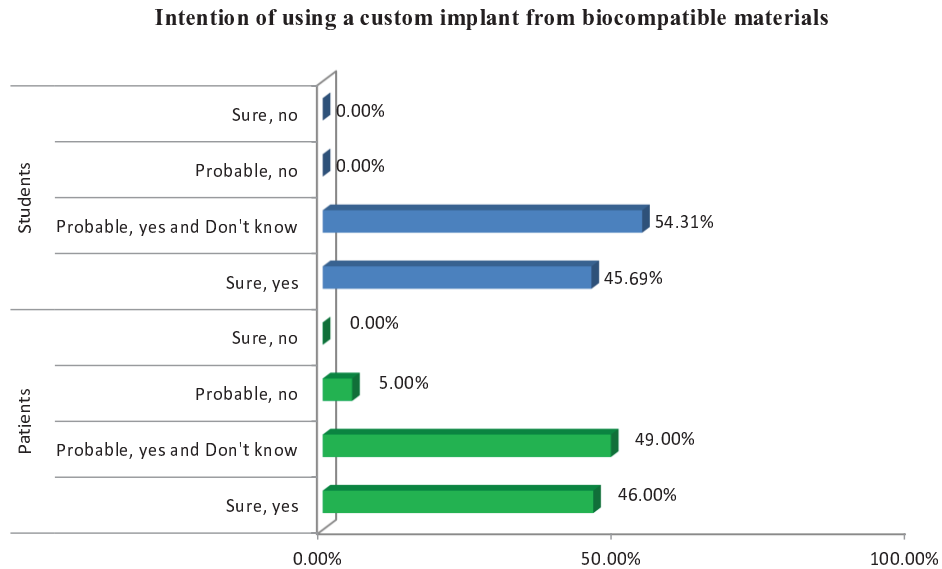


Fig. 2. The share of respondents answers depending of their intention for using a custom implant made from biocompatible materials

The specialist physician and the family physician are the main source of information that most respondents (88.18% patients; 85.50% students) say they will ask for advice in choosing, in case of need of a custom implant. Other sources of information specified subjects were: studies and articles, internet (medical sites) clinics. (Fig. 3)

The shares of more than 80% in declarations regarding the information sources used when is taken the personal decision for accepting medical intervention in which both students and patients placed in the first rank the healthcare providers (physician and family doctor) suggesting the confidence of population in the opinion of health professionals, including in the case of choice an implant for a surgical operation.

Both students and patients, as potential users of customized implant recognize mass media role in informing the public about the new product, hence the need to lobby for population information and greater adherence to the use of the new opportunities in solving surgery trauma, tumors, bone malformation and chronic degenerative pathology of osteoarticular apparatus.

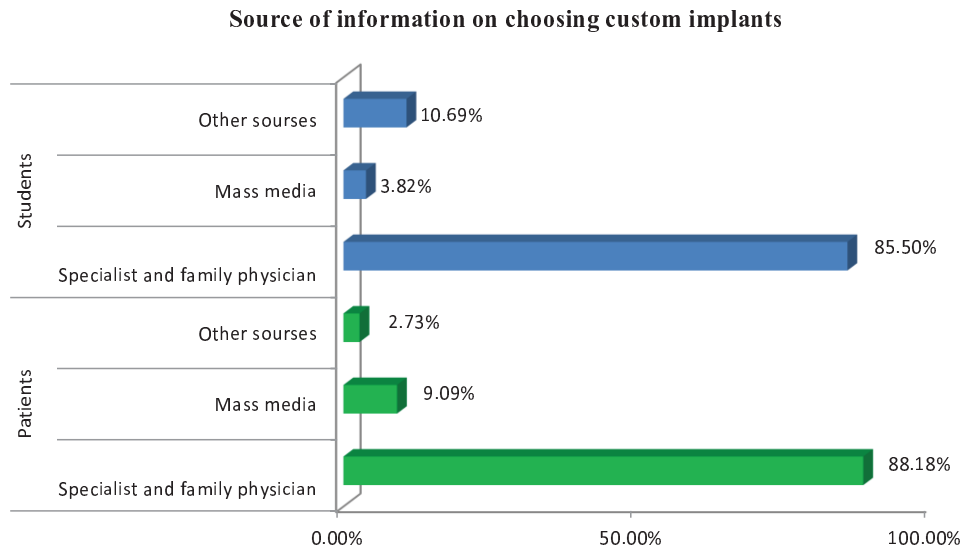


Fig. 3. The share of respondents answers depending of their source of information on choosing custom implants

Only 10 of the students surveyed (representing 8.62%) answered that they certainly want to choose a hospital in Romania for surgery required for a custom implant, while 3.45% categorically refused to access this kind of services in Romanian hospitals.

The analysis of the reasons given by those who argue strongly that they want to go to a hospital in Romania, shows competence and confidence in doctors specialists in Romania. Some of the interviewed subjects who responded certain that refuse, or be likely to refuse services offered in hospitals in Romania, motivate their choice of hospitals by poor equipment, poor conditions and lack of staffing in hospitals.

The uncertainty (87.93%) in choosing a hospital in Romania expressed by interviewed students is supported by answers where respondents consider that choosing a hospital would depend on the experience of specialists and success rates in similar interventions.

Patients' responses given to the question "Did you choose a hospital in Romania for a surgery with custom implant?" Shows that in share of 80.00%, the respondents have intention to use health services provided by hospitals in Romania.

A possible motivation for this approach could be differentiated costs of treatments required surgical implants, which in Romania are below those of other countries, the population that participated in the study, had low and medium monthly earnings and that surgical interventions are covered in the vast majority by the health insurance system in our country, could be a strong motivation for the decision expressed.

Students that in medical education have the opportunity to know the realities of Romanian hospitals declare a higher percentage (21.55%) that would not go to a hospital in the country for the required implant surgery, compared with the general population who said in a lower share (1.00%) this intention. These answers could be explained by the difference in standard of quality health services between the two population groups surveyed. (Fig. 4)

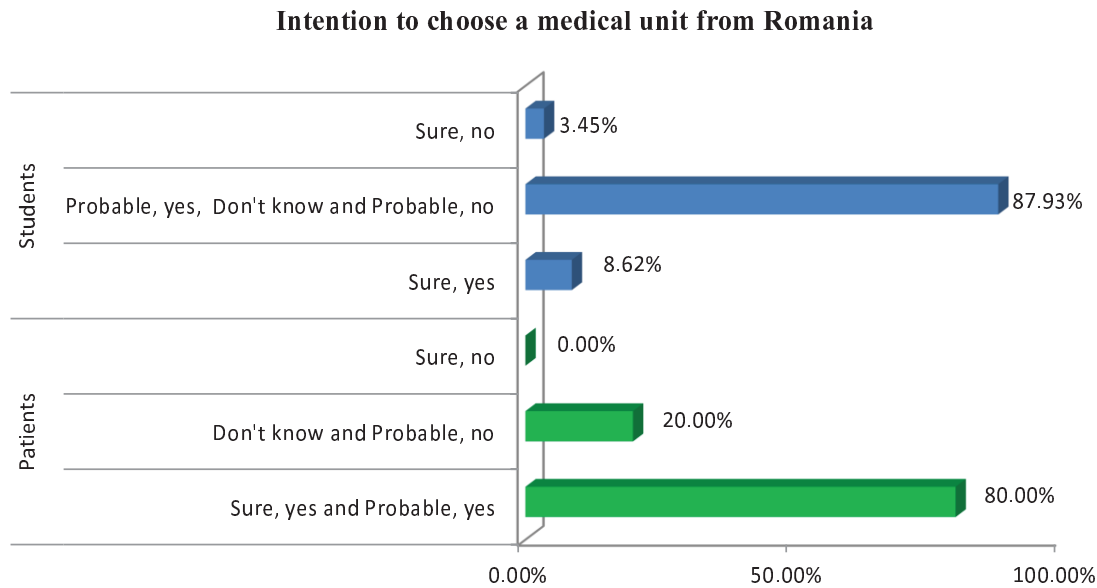


Fig. 4. The share of respondents answers depending of their intention to choose a medical unit from Romania

4. CONCLUSIONS

The study shows a relatively good level of knowledge of the public regarding the existence and usefulness of customized implants from biocompatible materials with the human body.

There is no study participant who totally reject the idea of using custom implants, which shows a very high level of of acceptability of these products.

The main source of information on the existence and usefulness of customized implants from biocompatible materials was the specialist physician, family physician, but it was underlined also the role Massmedia and other sources (scientific articles, Internet) to promote the new product.

Payment by the health insurance system of certain surgeries and implants is the main motivation in choosing the use of health services in Romania, for most patients investigated, while the quality of services provided by hospitals in the country is the main criterion for selecting the unit health for medical students.

5. ACKNOWLEDGEMENT

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