INTERNATIONAL JOURNAL OF CURRENT ADVANCED RESEARCH
ISSN: O: 2319-6475, ISSN: P: 2319-6505
Available Online at www.journalijcar.org
Volume 14; Issue 05; May 2025; Page No.220-224
DOI: http://dx.doi.org/10.24327/ijcar.2025.224.0047

Subject Area : Public Health

SHORT IMPLANTS AS A TOOL TO REDUCE ORAL HEALTH INEQUALITIES IN THE ELDERLY: A PUBLIC HEALTH PERSPECTIVE

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ARTICLE INFO

Received 13th April 2025
Received in revised form 27th April, 2025
Accepted 14th May, 2025
Published online 28th May, 2025

Key words:

Short Dental Implants (SDI), Elderly Oral Health, Health Inequalities, Edentulism Treatment, Public Health Policy

ABSTRACT

Existing research evidence about the elderly people in Germany and other European countries revealed that oral health especially in relation to income variation and access to dental care is still wanting. Thus, SDIs represent a conservative and relatively inexpensive solution for the edentulous elderly patient, who requires teeth just for simple functions; no extensive surgical procedures are necessary. In light of this, the study will undertake a systematic evaluation of SDIs in relative to their clinical effectiveness, cost-effectiveness, and patient satisfaction based on randomised controlled trials, cohort studies and policy documents. Findings indicate that SDIs are therapeutic models with high efficacy rates and also found to enhance functional capacity and quality of life of the patients without compromising any standard practices for all the patients requiring dental care services. These approaches may also help in relation to cost containment and access to enhance equity in oral health and health among the elderly people when they are included in national health systems.

INTRODUCTION

A component of health that cannot be overlooked is that of oral health and especially that of the elderly. In Germany and other European countries, an issue, which constantly challenges the healthcare institutions is the high percentage of the aging population that would need all specialized dental care. Socio-economic disparities, unequal distribution of access to health care, and inadequate funding in dental care worsen oral health inequalities. As a result of economic constraint, many elderly population in many European countries requiring dental prosthetics cannot afford quality prosthesis hence affecting their oral function and overall health. Such conditions as edentulism and severe periodontal diseases, are still common in the elderly affecting mastication function, communication and psychological well-being. For instance, people living with cardiovascular conditions and diabetes should also ensure that they seek professional dental care, which underscores the importance of affordable and efficient dental care services. Dental implants have proven to be the most effective method of dental restoration, and are more functional and cosmetically preferred as compared to conventional dentures (Shahdad, 2024). The importance of implantological procedures in dentistry in glance are disused previously (Schmidt-Breitung, 2022, Muller at all.). In table 1 we compare basic parameters of Regular implants vs SDI.

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Table 1. Comparison of Basic Parameters: Regular Implants vs. Short Dental Implants

Parameter	Regular Implant	Short Implant (SDI)
Diameter	~3.5–5.0 mm	~4.0–6.0 mm
Length	>10 mm	≤8 mm
Minimum bone tissue quality requirements for safe implantation	Good to excellent	Moderate to good
Reconvalescence time required after bone drilling and implant insertion	Several months (3–6)	Shorter (often<3 months)
Surgicalinvasiveness	Oftenrequires-boneaugmentation	Generally avoidsbonegrafting
Clinical success rate	>90%	>90% (comparable in many studies)

In this paper, we highlight the characteristics of short dental implants (SDIs) as a solution to the aforementioned challenges. Due to their ability to simplify surgical procedures and

mitigate the need for bone boosts, SDIs increase the options for accessibility and the affordability factor. This paper aims at dissecting the potentials of short implants in reducing oral health inequalities in Germany and Europe specifically the efficiency, possibility and consequences in elderly care.

MATERIALS AND METHODS

In this paper, the following aspects of short implants in elderly patients: clinical effectiveness, cost-utility and patients' satisfaction have been discussed based on a systematic review of the current literature. Source identification involved articles that were RCTs, cohort studies, and meta-analyses, which were published between 2015 and 2024. Searches of databases like Pub Med, Cochrane library and Google Scholar were made using terms such as "short implants", "elderly oral health", "edentulism treatment" and "health inequalities". These consist of policy reports from Germany and the European Union, as well as regional and national health statistics, to evaluate its receivability as well as its integration into public health policies (Sengupta et al., 2024). To make sure that no significant research was left unnoticed, inclusion criteria were developed for the systematic review regarding SDIs success rate, biomechanical property, patient satisfaction, and economical viability of SDIs in elderly patients. Studies that could not provide statistical analysis results or that have not made a clear distinction between implants and SDIs were excluded. Considerably more focus was made on samples originating from Germany and Europe to obtain a regional approach to healthcare policies, healthcare reimbursement, and clinical guidelines related to SDIs (Brown et al., 2024).

In accordance with PRISMA, (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), a selection protocol was followed. Titles and abstracts were checked for relevancy, and the full text assessed according to predetermined criteria. Specific measures sampled in the analyzed studies entailed survival rate, complication rate, and costs in relation to conventional implants and other prostheses. Quantitative research included patient self-reported experiences, perceived quality of life, and practitioners' insights into SDI implementations in geriatric dentistry (Campbell-Montalvo et al., 2022). In addition, the existing national and European strategic policies of public health were scrutinized to understand the level of adoption of SDIs in the healthcare context. Interviews with the German Federal Ministry of Health (Bundesministerium für Gesundheit) and the European Commission on oral health programs gave an understanding of the current activity and reimbursement legislation and policies (Gerlinger, 2024). Additional data was also collected through interviews of dental practitioners and public health professionals to gather their perceptions and experiences with SDI practie. This methodological research approach provides a strong foundation for the assessment of SDIs against the background of oral health inequalities in Germany and Europe (Shellard et al., 2022). These findings will be useful to policymakers, healthcare decision-makers, and dental practitioners for SDI implementation in public health settings.

RESULTS

Recent studies have shown that SDIs provide equal efficiency rates (over 90%) to that of regular-length implants; this is also valid in the case of low bone density (Ganji et al., 2023). It eliminates the need for additional procedures such as bone augmentation and consequently brings down time, cost, and the risks associated with the operations. This is especially important in Germany and other European countries where complex dental procedures may not be fully covered by public health insurance, thus important alternatives with favourable costs have to be provided to patients of this age. As observed, elderly patients with low income, and those with coexisting medical conditions, can also benefit immensely from SDIs techniquereflect ownership of lesser procedural risks. Since the population in Europe is growing older and conditions like osteoporosis and diabetes are quite usual, SDIs seem to be a useful solution for patients to avoid extensive bone grafting surgery. The findings of clinical studies on SDIs in Germany and other European countries further suggest strong osseointegration, a lower frequency of peri-implantitis, and a high level of patient satisfaction, thus emphasizing the practicality of the concept in the field of geriatric dentistry(Forbes-Haley, 2022).

More importantly, cost comparison shows that SDIs are cheaper than conventional implants, which makes them an option within the publicly funded health systems within Europe. In Germany, statutory health insurance reimburses partial costs of dental implants (GKV) but copayment might be a concern especially for elderly patients (Schwendicke and Bombeck 2023). Because SDIs are less invasive and generally require less costly implants, they may reduce surgical and material costs and thus enhance the availability of implant-supported prosthodontic care. Health economic assessments suggest that the use of SDIs could help containing future health costs and reduce the prolonged stays at the dentist for denture modifications and treatment of problems that could otherwise arise from ill-fitting dentures. Perceived benefits embrace enhanced oral function, smile appearance, and overall quality of life, thus reaffirming patient reports as crucial in fighting oral health inequalities in elderly populations (Nascimento et al., 2023). Several elderly people noted increased confidence, better nutrition caused by efficient chewing, and good psychology after receiving SDIs (Martínez-García et al., 2023). These improvements are also congruent with the goals of the European Union the overall goal of enhancing active and healthy aging.

Furthermore, in terms of the placement of SDIs, the simplified design of those presented here needs less clinical time and shorter chair times than clinical worked models, making them especially useful to busy public dental services in Germany and other EU countries (Dutta, 2024). Less time-consuming approaches help to decrease waiting lists, increase clinic output, and improve access to dental health services for elderly people. Additionally, educational activities that prepare individuals for dentistry careers, as well as postgraduate education programs, also focus on SDI methods as the future dental practitioners should be able to offer this treatment. The outcomes demonstrate that SDIs can contribute significant improvements in oral health inequalities for elderly people (Bai et al., 2024). Due to their considerable efficacy, relatively low costs, and low invasiveness, they are a valuable instrument in public health intervention programmes in Germany and Europe. The following conclusions and recommendations can be drawn for policy debate on including SDIs in national

health insurance systems to increase equal access to dental care services among frailer seniors.In table 2 we summarize our results.

Table 2. Summary of Results

Key Aspect	Findings
Clinical effectiveness	SDIs show high success rates (>90%) even in patients with low bone density
Surgicaladvantages	Avoidance of bone augmentation, reduced procedural risks, shorter chair time
Costefficiency	Lower material and surgical costs; suitable for partial reimbursement within public health systems
Patient benefits	High satisfaction, improved oral function, aesthetics, nutrition, and psychosocial well-being
Accessibility	Suitable for elderly patients with low income and comorbidities; less invasive than standard implants
Public health implications	Potential to reduce health inequalities and improve access within statutory health insurance systems
System-level advantages	Time-saving in clinical workflows; useful for public dental services with limited resources
Educational relevance	Increasing incorporation into dental training and continuing education programs

Discussion

Another factor that remains a concern is the rising elderly population in not only but also in other European countries: oral health issues and equal access to dental care remain crucial problems (Aida et al., 2022). As millions of elderly people are at high risk of edentulism and other oral care demands, they require effective, affordable solutions to address the gap in services. To date, significant improvement in dental technology has not changed the fact that most elderly patients cannot afford dental implants from a financial and/or procedural standpoint (Watanabe, 2024). SDIs have proven to be another potential option that can potentially improve reliability and cost efficiency, better yet, if included in state health care programs. Germany is no exception to this, being a European country with a growing elderly population that is in need of dental services. A large number of senior citizens have a limited income and governments offer them limited health care benefits; therefore, they cannot afford costly dental treatment. This is due to the high costs of the conventional fixtures, long surgical procedures, and even longer periods of healing after the treatment. SDIs, on the other hand, is a less invasive approach that does not entail high costs of treatment while being highly effective. Easy to implant and require low complications or adverse effects during operations that are well suited for geriatric patients who may have other illnesses that make them ineligible for implant surgeries (Mosaddad et al., 2024).

Expanded SDI coverage in Germany and across Europe could significantly enhance access in connected national health insurance plans (Faye et al., 2024). Germany's statutory health insurance system – Gesetzliche Krankenversicherung (GKV) offers extensive medical and dental care but restricts the coverage for traditional dental implants where patients are expected to self-fund the procedure. Thus, if policymakers pursue the reimbursement of SDI within the framework of public health insurance, they could eliminate the financial obstacles and promote access to oral health care. Sweden and the Netherlands are other European countries that have included dental implant treatments in their healthcare systems, thus providing a benchmark for Germany. Another key factor that must be addressed in order to encourage the broader use of SDI is the question of training programmes that would be required by personnel in the dental field (Rosario Michel et al., 2023). Although the process of SDI placement may be less intricate compared to conventional implants, there is crucial education required to facilitate proper implementation. More emphasis should be made on including SDI techniques in European dental education programmes for increasing usage in elderly patients with fixed bone structures or limited financial means. Therefore, there is need for implementation of Continuing Education programs and workshops for dentists to enhance them in delivering sdI in a professional manner.

However, the following challenges need to be discussed to enhance the possibility of these SDIs. An important limitation is the uncertainty of research on the long-term outcomes of SDIs in elderly patients (Mele et al., 2022). Nevertheless, further longer-term research is required to determine the long-term success rates, patient satisfaction, and other factors related to oral health. European cooperation may be particularly effective in generating clinically sound data that would help to substantiate the use of SDI in routine clinical practice. However, there are several limitations in the use of SDIs namely they may not be efficient in people with severe bone resorption (Joo et al., 2023). Unlike traditional implants that necessarily involve surgical treatment of the bone to reinforce the anchorage, SDIs work with the bone. In situations where there is considerable bone resorption, patients may require either zygomatic implants or other forms of prosthesis (Brennand Roper et al., 2023). German and European dental associations should invest more effort into studying hybrid cases where SDIs have been used together with other bone augmentation techniques to expand its usage (Padil et al., 2022).

Education of the public and the patients is also an important aspect of SDI implementation. Various surveys and questionnaires indicate that a large number of elderly patients are not even aware of the other implant options and therefore still believe that dental rehabilitation can be very costly and difficult (Jayachandran, 2022). Given these developments, national or European-wide campaigns should be launched to raise awareness of SDIs, emphasize the benefits of their usage and special value for the elderly. Involving many stakeholders such as dental practitioners, healthcare providers, and policymakers, SDIs need to be recognized as standard modalities (Farina and Cirillo 2024). Future policy imperatives should focus on extending application of SDIs as key elements of both German public health initiatives and overall EU

healthcare systems. Specific policy recommendations should include extending the access to SDIs through statutory health insurance programs, funding research on medium- and long-term outcomes, increasing access to dental training, and raising awareness (Da Cunhaet al., 2023). With these interventions, Germany and other European nations will be able to make giant leaps in the reduction of oral health inequalities for elderly patients and maintain access to quality treatment care.

Conclusion

In conclusion, it is evident that short dental implants are vital in managing oral health inequalities targeting the elderly in Germany and throughout Europe. With the growing population of elderly people, availability of adequate and reasonable dental care is a crucial aspect. SDIs are effectively a real and potential way to minimize the risk of extensive surgical procedures, especially how helpful they are for elderly patients with lower bone density or other comorbidities. Their cost structure is also compatible with the statutory health insurance in Germany and other European health policies that are geared towards provisioning affordable basic medical procedures. It is recommended that increasing the use of SDIs can be facilitated for dentists by integrating them into national reimbursement programs and offering academic training. Since dental care is only partially reimbursable by public insurance, more subsidies or increased reimbursement for SDIs could help close such gaps so that lower-income elderly people get proper dental services. In terms of a wider European context, the integration of SDIs aligns with the EU focus on preventive care and patient-oriented approach in treatment that will enhance the oral health of those countries within the union. Future efforts should be directed towards the dissemination of awareness programs, cooperation with various faculties, and more tangible clinical studies pertaining to the lasting effects of SDIs. By removing both financial and structural obstacles, SDIs can play a key role in the improvement of the condition of older people and further development of efficient and readily available healthcare systems in Germany as well as the whole EU.

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How to cite this article:

Hendrik-Matthias Pallien, Andreas Mirwald and Viktor Foltin, Julien Lochmann, Attila Czirfusz. (2025). Short Implants as a Tool to Reduce Oral Health Inequalities in the Elderly: A Public Health Perspective, International Journal of Current Advanced Research, 14(05), pp.220-224.

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