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ORIGINAL ARTICLE BREAST SURGERY

Does Demand for Breast Augmentation Reflect National Financial Trends?

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Abstract Aesthetic plastic surgery is a consumer-driven industry, subject to influence by financial forces. A changing economic environment may thus impact on the demand for surgery. The aim of this study was to explore trends in demand for bilateral breast augmentation (BBA) in consecutively presenting patients over an 11-year period and to examine if a correlation exists between these trends and changes in Gross Domestic Product (GDP), a key economic indicator. This study revealed a correlation between annual number of breast augmentation procedures performed and GDP values ($r^2 = 0.34$, p value $= 0.059$). Additionally, predicted number of BBA procedures, based on predicted GDP growth in Ireland, strongly correlated with actual number of BBA performed ($r^2 = 0.93$, p value $= 0.000001$). Predicted GDP growth can potentially forecast future demand for BBA in our cohort allowing plastic surgeons to modify their practice accordingly.

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Keywords Breast augmentation · Cosmetic surgery · Economic indicators

Introduction

Unlike other areas of medicine, aesthetic surgery follows the same economic laws and principles as other service industries. Ebbs and flow within the economy predict and explain the rate and fluctuation in demand for luxury goods, which includes aesthetic procedures. Economic growth, recession and recovery have impacted the industry globally. Studies suggest that the relationship between the economic environment and aesthetic surgery is a direct and quantifiable correlation [1]. The American Society of Plastic Surgeons (ASPS) has previously highlighted this relationship by naming aesthetic procedures as a key economic indicator in their 2012 Annual Report [2]. Paik et al. [3] also reported a significant positive relationship between total aesthetic procedures and economic indicators including Gross Domestic Product (GDP).

The aim of this study was to explore trends in volume of Bilateral Breast Augmentation procedures (BBA) performed in Cork University Hospital and South Infirmary and Victoria University Hospital and compare these trends with GDP. The secondary aim was to predict growth, enabling plastic surgeons to tailor their services to future demand.

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Patients and Methods

A retrospective analysis of consecutive patients who underwent BBA over the study period 2003–2014 was performed along with trends in GDP over the same period. While costs varied over the 10-year period, the current average cost of the procedure is approximately 4500 euros (€). The annual figures for GDP, defined as the value of all goods and services produced in a country per year, were provided by the Central Statistics Office website [4].

The % change in annual GDP values was used to predict the number of BBA cases for the following year and similarly the % change in number of BBA procedures over a 1-year period was used to predict GDP rates for the following year. A one-year time lag was used to allow for the delay between economic cause and effect. Economists do not expect a response to changes in the economy, or more specifically changes to the amount of money in the economy, for a time period of at least 6–9 months [5].

Actual and predicted GDP values were compared as were actual and predicted number of BBA procedures. Using Microsoft Office Excel 2013, a simple linear regression analysis to calculate the coefficient of determination was performed to quantify these relationships and to provide an indication of the strength of the correlation, such that $0 \leq r^2 \leq 1$. From Department of Finance forecasts [6] values for projected annual GDP were used to calculate predicted BBA numbers for years 2016 and 2017.

A scale factor of 10,000 was used when comparing values for number of BBA procedures to GDP values to clearly visualise trends between the two datasets.

Results

When comparing GDP with number of BBA procedures, similar trends were identified for years 2004–2014 (Fig. 1). Linear regression analysis gave a coefficient of determination (r^2) of 0.34 (p value = 0.059) indicating a correlation between the two datasets. Figure 2 demonstrates predicted GDP values (based on % change BBA numbers) to actual normalised GDP for years 2003–2014. The calculated coefficient of determination, (r^2), gave a value 0.40 (p value = 0.035), also indicating a correlation.

Predicted number of BBA based on % changes in actual GDP was compared to actual number of BBA procedures (Fig. 2). Linear regression analysis gave a coefficient of determination (r^2) of 0.93, indicating a strong correlation. This was statistically significant (p value = 0.000001). Predicted number of BBA procedures for years 2015, 2016 and 2017 based on projected GDP rates is demonstrated in Fig. 3.

Discussion

Although growth rates fluctuate annually, overall demand for aesthetic surgery continues to increase globally. The United States and United Kingdom, both major providers of aesthetic surgery, have experienced different growth patterns in this industry over the last decade. The American Society of Plastic Surgeons (ASPS) shows a maturing market with slow increases reported since 2008; 15.6 million procedures were performed in 2014, at a cost of US $12.9 billion [7]. Data provided by the British Association of Aesthetic Plastic Surgeons (BAAPS) show a considerable decline in overall procedures (9%) in 2014 for the first time in a decade [8]. Both organisations found bilateral breast augmentation to be the fastest growing and most popular aesthetic procedure. A seventeen-year comparison published by the American Society for Aesthetic Plastic Surgery (ASAPS) in 2013 reported a 210% increase in the number of breast augmentations since 1997 (Fig. 3) [9]. As in this study, overall reports from all these major plastic surgery societies predict a steady increase in the number of BBA procedures.

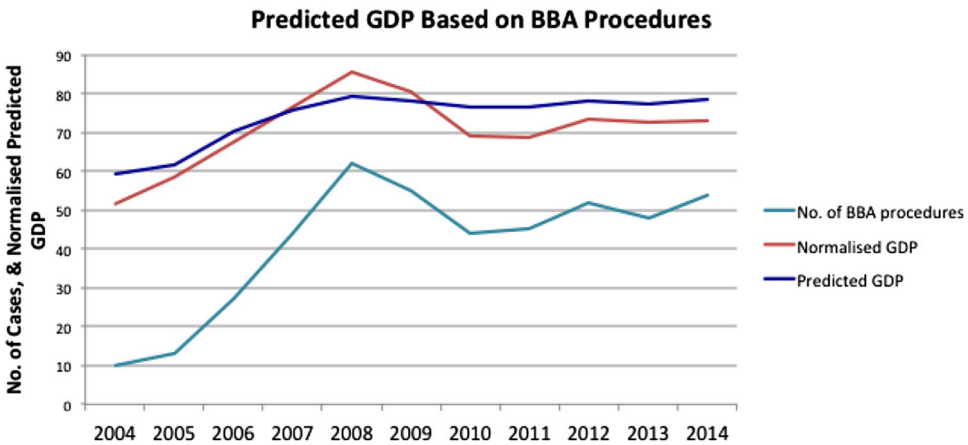

Fig. 1 The predicted Gross Domestic Product (GDP) based on the number of breast augmentation procedures

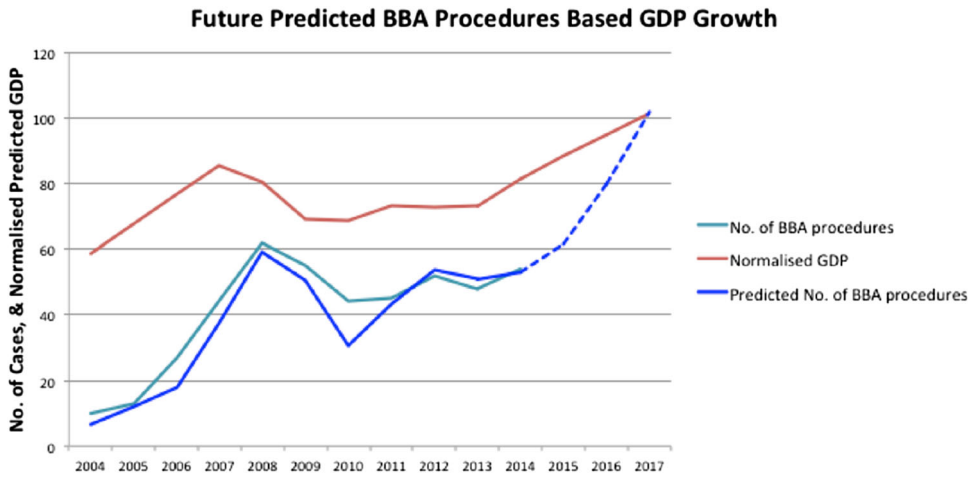

Fig. 2 The predicted number of breast augmentation procedures based on Gross Domestic Product (GDP) including predictions for 2016–2017

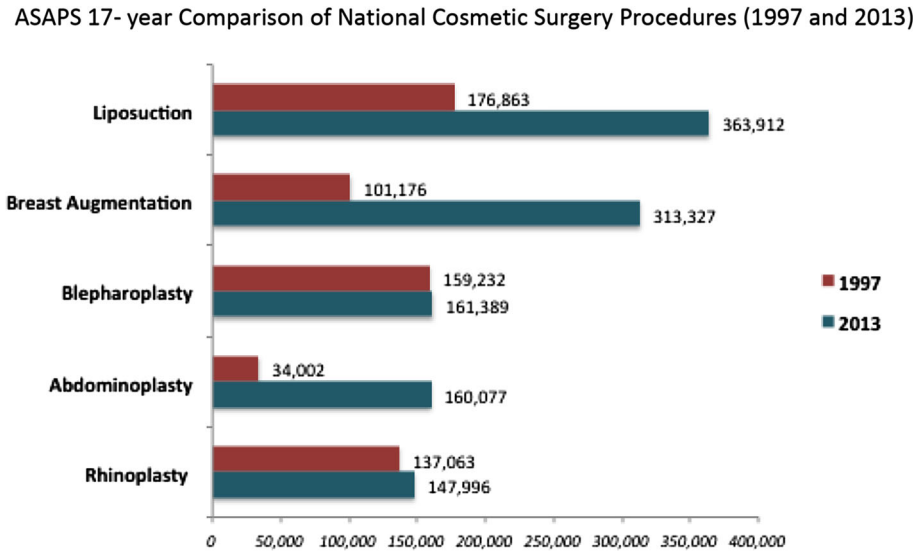

Fig. 3 The number of breast augmentations and other cosmetic surgeries performed in 1997 compared to 2013 (from the American Society for Aesthetic Plastic Surgery)

Between the mid 1990s and 2007, Ireland experienced a period of rapid economic growth, often referred to as the 'The Boom". In 2008, the economy underwent a dramatic reversal resulting in the post-2008 economic downturn, and in more recent years a gradual recovery. Although no national database exists in Ireland, it has been suggested that the number of aesthetic surgery procedures has been in keeping with our changing economy. The Irish Association of Plastic Surgeons has reported an increase in aesthetic surgery procedures in recent years [10], and this is supported by an increased number of private clinics offering these surgeries, a reported increased number of enquires at these clinics, and continued media interest in the industry. Social media in particular has resulted in patients acquiring increased exposure to aesthetic surgery procedures in the form of uploaded video clips detailing procedure details and patient testimonials. These often glamorise complex procedures and emphasise only the immediate positive results therefore attracting a large number of patients [11]. As yet no study has compared growth patterns in Ireland to our national economic indicators.

Gordon et al. [1] reported a direct correlation between breast augmentation, rhytidectomy and liposuction to three US stock market indices. This study indicates a correlation between trends in BBA procedures and GDP. Although it is a small data set, it suggests GDP can be used to predict trends in number of BBA procedures. Hoppe et al. also compared cosmetic surgery procedures to well-established economic indicators including GDP, with similar use of simple linear regression for data analysis [12].

Our study supports findings of earlier reports [2, 9] and demonstrates a similar pattern as seen in the UK. Nassab and Harris [13] compared US and UK data and identified two hugely different growth patterns and concluded economic indices are accurate indicators in the UK, whereas rates in the US seem independent of these factors. Wilson et al. recently highlighted that the relationship between economic growth and cosmetic surgery is a correlation, not

a direct cause and effect [14]. Multiple other factors are influencing and driving the US market, supporting Nassab et al.'s earlier study. The US has a very established aesthetic surgery industry. As a result, cosmetic surgery may no longer be considered as a luxury service and therefore not be as susceptible to annual GDP changes. It has been suggested that the industry is approaching saturation although the dramatic rise in minimally invasive procedures suggests a shift in consumption in the market rather than saturation. Minimally invasive procedures are experiencing rapid and continued growth, generating major revenue in the US despite economic downturn [14]. In 2014, the UK experienced a decline in cosmetic surgery procedures for the first time in a decade despite steady economic growth. Although available UK data are unlikely to be fully representative of the market, specifically the minimally invasive procedure market, this decline could suggest a maturing market not purely driven by economy as described in US. From our study, economic indices are predictors of current trends in the Irish aesthetic surgery industry as was previously seen in the UK before 2014. As the Irish market matures, we may experience a similar decline despite economic growth. Despite these positive economic forecasts for the Irish economy, concerns of global economic instability may impact the national market, as may public perception of controversies within the industry such as increasing reports of anaplastic large cell lymphoma (ALCL) related to breast implants internationally [15].

Limitations in this the study include that it represents a single-centre experience. Our unit services a population of an estimated population of over 1.2 million. The figures within the cohort studied are not fully representative of this population as an unknown number are performed in unregistered private settings as well as outside Ireland with the recent rise in medical tourism. These limitations have been experienced by previous studies based on data provided by the British Association of Aesthetic Plastic Surgeons and the American Society for Aesthetic Plastic Surgery. However even allowing for this, the study supports a direct and quantifiable correlation. Larger studies addressing national trends would be beneficial in further analysing this correlation. The inclusion of variables detailing changing dynamic demographics of the population such as patients' socioeconomic status, marital status and specific geographical areas (i.e. rural vs urban) as evaluated in the US by Broer et al. [16] would examine other additional influences on trends in cosmetic surgery growth.

Based on GDP values from the Department of Finance economic forecasts, the authors found a steady increase in number of BBA procedures predicted for years 2016 and 2017 in this study. Currently, these are useful predictions within this consumer-driven industry although other factors may come into play as our market matures. These predictions offer aesthetic surgeons the opportunity to meet future demands and tailor their services accordingly. In the future, established surgeons may review their practice set-up, shifting from one that heavily emphasises surgical procedures to a mixed practice offering both surgical and minimally invasive procedures.

Conclusion

In this cohort, there is a strong correlation between the number of breast augmentation procedures and GDP, a key economic indicator. Although it is not a direct cause and effect relationship, it can provide a useful insight into future demands within the aesthetic surgery industry in Ireland. This will allow new and established aesthetic surgeons to plan and tailor their practices.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest to disclose.

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