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Socio-economic factors, cultural values, national personality and antibiotics use: A cross-cultural study among European countries

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ABSTRACT

There are considerable cross-national differences in public attitudes towards antibiotics use, use of prescribed antibiotics, and self-medication with antibiotics even within Europe. This study was aimed at investigating the relationships between socio-economic factors, cultural values, national personality characteristics and the antibiotic use in Europe. Data included scores from 27 European countries (14 countries for personality analysis). Correlations between socio-economic variables (Gross National Income per capita, governance quality, life expectancy, mean years of schooling, number of physicians), Hofstede's cultural value dimensions (power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, indulgence), national personality characteristic (extraversion, neuroticism, social desirability) and antibiotic use were calculated and three regression models were constructed. Governance quality ($r = -.51$), mean years of schooling ($r = -.61$), power distance ($r = .59$), masculinity ($r = .53$), and neuroticism ($r = .73$) correlated with antibiotic use. The highest amount of variance in antibiotic use was accounted by the cultural values (65%) followed by socio-economic factors (63%) and personality factors (55%). Results show that socio-economic factors, cultural values and national personality characteristics explain cross-national differences in antibiotic use in Europe. In particular, governance quality, uncertainty avoidance, masculinity and neuroticism were important factors explaining antibiotics use. The findings underline the importance of socio-economic and cultural context in health care and in planning public health interventions.

Introduction

Antibiotics are important medicines widely used both in hospital sector and in community as self-medication [1]. The spread antimicrobial resistance in healthcare settings and in the community threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi [2–4]. Increasing bacterial resistance leads to greater difficulties in treating infections and ultimately contributes to increased mortality rates [5,6]. In addition to human costs, treatment of patients with infections due to antimicrobial-resistant organisms have higher costs ($6000–$30,000) than treatment of patients with infections due to antimicrobial- susceptible organisms [5].

World Health Organization (WHO) concludes in its report about antimicrobial resistance that resistance to common bacteria has reached alarming levels in many parts of the world and that in some settings few of the available treatments options remain effective for common infections [4]. In the 2014 report, WHO advocates the correct use of antibiotics by targeting all levels of the health care system from patients and health workers to policymakers and industry [4]. While WHO's suggestions are certainly needed, the successfulness of these policies is likely to vary between different counties due to considerable cross-national differences in public attitudes towards antibiotics use [7–10], use of prescribed antibiotics [11], and self-medication with antibiotics [1]. These differences can be partly explained by different health care structures and policies [12] but also with differences in socio-economic factors [13,14] like population income [15,16] and national culture [17,18]. For example, Goldschmidt emphasized the importance of basic education (not only illness related) for successful medical interventions in eliminating transmissible diseases [19]. Similarly, such economy related factors as number of physicians [16] and

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general health of the population (life expectancy) [18] might also influence the use of antibiotics.

Governance quality and antibiotic use

A recent study reported a statistically significant relationship between corruption and antimicrobial resistance in a sample of 28 European countries [20]. In the same vein, we can assume that the effectiveness of health care policy of a country and, consequently, correct use of antibiotics reflects the quality of governance in the country concerned. Since 1996 World Bank has published Worldwide Governance Indicators (WGI) for measuring six dimensions of governance [21]. These indicators are "Voice and Accountability" (VA), "Political Stability and Absence of Violence" (PV), "Government Effectiveness" (GE), "Regulatory Quality" (RQ), "Rule of Law" (RL) and "Control of Corruption" (CC). The first index, VA, measures in what degree the citizens can participate in selecting their government, have freedom of expression and association, and how free the media is [21]. The second index, PV, refers to the probability that the government will be destabilized or overthrown by violent or unconstitutional means, including political violence and terrorism [21]. The third index, GE, measures the quality of public and civil services, and the degree of their independence from political influence, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies [21]. The RQ index measures the existence of sound policies and regulations that permit and encourage private sector development. The RL measures the extent to which agents have confidence in and follow the rules of society. This includes in particular the quality of contract enforcement, property rights, the quality of police and the courts, as well as the likelihood of violence and crime [21]. Finally, CC measures corruption, i.e. the extent to which public power is applied for private gain including both petty and grand forms of corruption [21]. These six aggregate indicators combine the views of a large number of enterprise, citizens and expert survey respondents in industrial and developing countries. It should be noted, however, the WGI indexes are not separate measures of different aspects of the quality of governance but form together a broad measure of the quality of governance [22]. Therefore, a combined index for the WGI was used in this study.

Cultural factors and antibiotic use: Hofstede's cultural values

Cultural factors have been reported to be related to the consumption of antibiotics as well as to illness behavior in general [7,9,10,17,18,23]. One of the most commonly used measures for culture is Hofstede's model for cultural value dimensions [18,24]. According to Hofstede, culture can be named as "the collective programming of the mind that distinguishes the members of one group or category of people from another" [24]. The center of culture is "a system of societal norms consisting of the value systems (or the mental software) shared by major groups in the population", which emphasizes the fact that values are in the most essential part of national culture and these values are shared by the majority. According to Hofstede, culture is mainly composed of four empirically identified dimensions. These dimensions were power distance (PDI: inequality between people), uncertainty avoidance (UAI: the level of stress in a society related to unknown future), individualism vs. collectivism (IDV: the integration of individuals into primary groups), and masculinity vs. femininity (MAS: the division of emotional roles between males and females). Later, Hofstede and his colleagues added two new dimensions to their cultural model: the long-term orientation (LTO) and indulgence vs. restraint (IND) dimensions [24]. This dimension describes how the society sees its own past while dealing with the challenges of the present and future. Societies with a short-term orientation are normative societies which prefer to maintain traditions and view societal change with suspicion. Societies scoring high on log-term orientation are, on the other hand, more pragmatic and oriented towards future rewards, in particular saving, persistence, and adapting to changing circumstances [24]. Indulgence vs. restraint dimension refers to the extent to which people try to control their desires and impulses. Societies high in indulgence dimension value gratification of basic human drives and enjoying life and having fun whereas societies emphasizing restraint suppress individuals' gratification of needs with strict social norms [24]. Hofstede's model has been used earlier in few studies about antibiotics use and infection control [17,25–29].

National personality characteristics and antibiotics use: Eysenck's personality dimensions

In the same way as countries differ in terms of values, research shows that countries differ in term of dominant personality characteristics [30]. Eysenck's personality model includes such dimensions as neuroticism (i.e., emotional instability and high levels of negative affect like depression and anxiety), extraversion (i.e., being outgoing, talkative, and high on positive affect), and psychoticism (i.e., personality characterized with tough-mindedness, non-conformity, inconsideration, recklessness, hostility, anger and impulsiveness) [31]. Eysenck Personality Questionnaire (EPQ) includes also a Lie scale for measuring tendency to socially desirable responding. Cross-cultural studies about the EPQ scales have showed that Extraversion and Neuroticism scales of EPQ are valid and reliable measures of personality across countries while Psychoticism scale seems to show lower reliability [32]. The relationship between antibiotic consumption and personality factors has not been studied earlier.

Aims of the study

The aim of the present study was to investigate the relationships between antibiotic use and socio-economic, national personality characteristics and cultural factors. Following hypotheses were formed:

1) Higher antibiotic use should be related to following socio-economic variables: lower income per capita (Gross National Income per capita, i.e. GNI), lower level of governance quality, lower number of physicians per capita, lower level of education (mean years of schooling), and lower level of national health (life expectancy).
2) Higher antibiotic use should be positively related to cultural values of power distance, collectivism, masculinity, uncertainty avoidance, and short-term orientation. Indulgence as value should have no relationship to antibiotic use.
3) Higher antibiotic use should be positively related to neuroticism and lie scale (social conformism) whereas extraversion should not be related to antibiotic use.

The rationale behind these hypotheses is that antibiotic medicines are relatively easy to access and inexpensive (at least for Europeans) and, thus, they are used as coping strategy to regulate uncertainty and anxiety related to being ill especially when the healthcare sector lacks coordination and resources.

Methods

Measures of antibiotic use

Five indicators for antibiotic consumption in the community (primary care sector) in Europe 2013 were downloaded from

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