Antimicrobial use in Hungarian long-term care facilities: High proportion of quinolone antibacterials

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ABSTRACT

The aim of this survey was to estimate the burden of antimicrobial use and to describe the determinants for antimicrobial use in Hungarian long-term care facilities (LTCFs) in order to increase the attention given to the proper prescription for this vulnerable population. A one-day point-prevalence study was undertaken between April and May 2013. Data on resident treated with an antibacterial, antimycotic or tuberculostatic for systemic use were collected prospectively on a single day in each participating LTCF with over 50 beds. Descriptive statistics were used to present the data. 91 LTCFs with 11,823 residents participated in this survey. 156 residents (1.3%) were given antimicrobials. 96.8% of antimicrobials were mostly prescribed for therapy included urinary tract infections (40.3%), respiratory tract infections (38.4%) and skin and soft tissue infections (13.2%). The most common therapeutic antimicrobials (97.5%) belonged to the ATC J01 class of 'antibacterials for systemic use'. The most important J01 subclasses were J01M quinolone antibacterials (32.7%), J01C beta-lactam antibacterials (25.2%), J01D other beta-lactam antibacterials (11.3%) and J01F macrolides, lincosamides and streptogramins (11.3%). Antimicrobials were mostly prescribed empirically whereas 3.8% was microbiologically documented treatments. 3.2% of all prescribed antimicrobials were prescribed for the prophylaxis of urinary tract infections (60%) and ear, nose, mouth infections (40%). Our results emphasize the need of a national recommendation for good practice in LTCFs in order to avoid inappropriate antimicrobial therapy leading to spread of multidrug resistant pathogens. In addition, continuing education of prescribers on antimicrobial treatment is essential.

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1. Introduction

Elderly residents of long-term care facilities (LTCFs) are at high risk for acquirement of infections due to their increased susceptibility (e.g. immonusenesence, functional disability, chronic diseases, the use of invasive devices) and institutional factors (e.g. close proximity, low priority of infection prevention and control measures). Because of infections, residents are frequently treated with antimicrobial agents, which are leading to the emergence of antimicrobial resistant pathogens (e.g. methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Enterococcus* spp.) (Bronzwaer et al., 2002; Van Buul et al., 2012).

Several studies have been published with regard to excess use of antimicrobials and resistance in LTCFs, nevertheless there is only a limited knowledge about the prescription of antibacterial agents in European LTCFs. Therefore, the European Centre for Disease Prevention and Control (ECDC) implemented the methodology of two EU-funded projects, the 'Improving Patient Safety in Europe' survey on the status of infection control and surveillance programs in LTCFs (IPSE, 2006–2008) and the 'European Surveillance of Antimicrobial Consumption – Nursing Homes subproject' survey on antimicrobial use in nursing homes (ESAC-NH, 2008–2010) and funded the HALT project (Healthcare Associated Infections in LTCFs) in 2008. The purposes of HALT project were to get cross-country comparable data on infections, antimicrobial use and infection control practices in European LTCFs. After a pilot survey in 2009, the European-wide point prevalence survey was performed in 2010, including 25 countries with 722 LTCFs (including 42 Hungarian LTCFs) (Suetens, 2012). In 2013, a repeated survey (HALT-2) was set up including 19 countries with 1.182 LTCFs.

This article presents the Hungarian results of the HALT-2 survey, focusing on antimicrobial use in participating LTCFs.

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2. Materials and methods

The HALT-2 survey was conducted between April and May 2013. In Hungary, all registered LTCFs (e.g. general nursing care, residential care, psychiatric care) with 50 beds and over (in total, 420 LTCFs; 24% of all Hungarian LTCFs) were invited to participate voluntary and anonym in this survey. Participating LTCFs were asked to choose one single day during the survey period to collect all necessary data prospectively.

Within the participating LTCF, a resident was considered eligible for the survey if (1) she/he lived permanently in the LTCF, (2) had resided there for at least one day and (3) was present at 8 AM on the day of the survey.

According to the protocol, data were collected at LTCF and resident level (for the latter, including infection and antimicrobial use data if any) on standardized data collection forms (paper-based questionnaires). The LTCF questionnaire collected data on structural and functional characteristics of LTCF (e.g. demographics, predisposing factors of all eligible residents as denominator data, infection control practices).

For each eligible resident who showed a sign/symptom of an infection and/or treated with an antibacterial agent on the day of the survey, a resident questionnaire was completed. In respect of antimicrobial use, the Anatomical Therapeutic Chemical (ATC) classification system of the World Health Organization Collaborating Centre for Drug Statistics Methodology was used to classify the substances used. Data on all oral, rectal, intramuscular, intravenous or by inhalation administered treatments with antibacterials (ATC class J01), antimycotics (J02) and tuberculostatics (J04) for systemic use were collected. Antivirals for systemic use, antimicrobials for topical use and antiseptics were not included. This form also included questions on resident demographics included demographic data, antimicrobial name, administration route, type of treatment (prophylactic or therapeutic), indication for antimicrobial use (the site of diagnosis for treatment intention of an infection), place and person of prescription, isolated microorganisms and selected antimicrobial resistance data (oxacillin-sensitive/resistant *Staphylococcus aureus*, glycopeptides-sensitive/resistant *Enterococcus* species, 3rd generation cephalosporin and carbapenem-sensitive/resistant Enterobacteriaceae, carbapenem-sensitive/resistant *Pseudomonas aeruginosa*, carbapenem-sensitive/resistant *Acinetobacter baumannii*).

Because of it was important that surveyors record all necessary data perfectly on resident questionnaire to allow prevalence to be precisely estimated, training of LTCF staff was considered a priority throughout the preparation of the survey. Prior to the survey period, six, one-day national training courses were given by the national coordinating center (National Center for Epidemiology, NCE) to familiarize LTCD surveyors with the methodology and the data collection. Standardized training curriculum and material was provided in English by the ECDC.

Completed questionnaires were sent to the NCE by each LTCF. After data cleaning, these data were inputted into a software program. An electronic copy of data from each LTCF was emailed securely to the ECDC EU-wide database without resident-identifying data. All LTCF were sent a national and an institutional summary report generated by the software program.

The objectives of this study also were to assess the validity of collected data collected by LTCFs. Thus, a data validation study was performed in one LTCF with over 100 beds per country. A trained external surveyor (NCE staff) had to visit the randomly selected LTCF on the same day as the point prevalence survey and conduct a parallel blinded data collection.

The survey did not entail any direct contact with the residents therefore ethical approval was not important. Confidentiality of data was assured by the use of a unique study number for each participating LTCFs and eligible residents allotted by the national coordinating center.

3. Results

A total of 91 LTCFs with 11 823 eligible residents participated in the survey. During the survey period, 156 residents (mean prevalence: 1.3%; range: 0–6.4%) were receiving one or more antimicrobial agents on the day of the survey.

Among residents receiving antimicrobial, 61.6% were female and 25.8% were over 85 years. The most frequent risk factors were the impaired mobility (63.5%), followed by incontinence (61.6%) and disorientation (35.8%).

Antimicrobials were mostly used for therapeutic purposes (96.8%). The most frequent indication for antimicrobial use was the treatment of urinary tract infections (40.3%), respiratory tract infections (38.4%) and skin and soft tissue infections (13.2%). The most common therapeutic antimicrobial agent (97.5%) belonged to the ATC J01 class of 'antibacterials for systemic use'. The most important J01 subclasses were J01M quinolone antibacterials (32.7%), J01C beta-lactam antibacterials (25.2%), J01D other beta-lactam antibacterials (11.3%) and J01F macrolides, lincosamides and streptogramins (11.3%).

The most often empirically prescribed antibacterials for urinary tract infections were quinolone antibacterials (64%), followed by sulfonamides and trimethoprim (15.6%) and beta-lactam antibacterials (7.8%). The most commonly prescribed empirically treatments for respiratory tract infections were beta-lactam antibacterials (40.9%), followed by other beta-lactam antibacterials (21.3%) and macrolides, lincosamides and streptogramins (14.8%). The most common antibacterials prescribed for therapy of skin and soft tissue infections were beta-lactam antibacterials (47.4%), followed by macrolides, lincosamides and streptogramins (26.3%) and tetracyclines (10.5%). The distribution of antimicrobial agents for infections is presented in Table 1.

Therapeutic antimicrobials were mostly prescribed empirically whereas 3.8% was microbiologically documented treatments. 3 positive microbiology results were available for gastrointestinal infection (*Clostridium difficile*), 2 for urinary tract infection (*Enterobacter cloacae, Escherichia coli*) and one for other infection (*S. aureus*). During the survey, no resistant strains were found.

A total of 3.2% of all prescribed antimicrobial agents was used for the prevention of urinary tract infections (60%) and ear, nose, mouth infections (40%).

Elements of antimicrobial policy (e.g. availability of an antimicrobial committee, regular training on appropriate antimicrobial prescribing, restrictive list of antimicrobials, local data on antimicrobial resistant pathogens, written therapeutic guidelines) were available in 82 LTCFs (90.2%).

4. Discussion

In the last decade, several European and overseas countries set up programs to increase awareness for the problem of infections and antimicrobial use in their LTCFs. The aim of the HALT-2 project was to collect comparable data on infections and use of antimicrobial agents among elderly residents in European LTCFs.

In Hungary, the collected national data allowed for the estimation of the prevalence of antimicrobial use in participating LTCFs. The prevalence of antimicrobial use among participating LTCFs was lower (1.3%) compared with results from other European and overseas surveys (6–15%), that is the overuse of antimicrobials is not common in participating LTCFs (Blix, Bergman, & Schjott, 2010; Cotter, Donlon, Roche, Byrne, & Fitzpatrick, 2012; Eikelenboom-Boskamp et al., 2011; Pakyz & Dwyer, 2010).