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# Handwashing behaviour among Chinese adults: a cross-sectional study in five provinces

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ABSTRACT

*Objectives:* To describe the patterns of handwashing behaviour among Chinese adults, and assess their associations with sociodemographic factors and knowledge of hand hygiene.

*Study design:* A representative sample ($n = 6159$) of Chinese adults aged 18–60 years in five provinces was attained by multiple-stage, stratified sampling mainly based on geographical location and economic status. Data on handwashing behaviour, knowledge of hand hygiene and sociodemographic factors were collected through self-administrated questionnaires.

*Methods:* Associations between handwashing behaviour and sociodemographic factors were tested in logistic models. Path analysis was applied to examine the associations between sociodemographic factors, knowledge of hand hygiene and proper handwashing behaviour in order to evaluate the relative magnitude of these determinants and internal relationships.

*Results:* This study found that 52.7% (rural vs urban: 44.6% vs 56.8%) and 67.3% (rural vs urban: 59.7% vs 71.1%) of Chinese adults reported they always washed hands before eating and after defaecation, and 30.0% (rural vs urban: 25.1% vs 32.8%) of adults always used soap or other sanitizers during washing. Using the criteria of 'always or very often washing hands with soap before eating and after defaecation without sharing a towel with family members after washing', only 47.2% (rural vs urban: 23.8% vs 59.1%) of the adults were graded to practice proper handwashing behaviour. Urban area, high level of education level, high level of knowledge about diseases, female gender and older age were protective factors for good hand hygiene; of these, area was found to be associated most strongly with handwashing behaviour.

*Conclusions:* Adherence to an appropriate handwashing method and duration of handwashing are critical problems among Chinese adults. Area difference, level of education and level of knowledge of hand hygiene were most strongly associated with handwashing behaviour, and should be targeted in future health education.



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## Introduction

Handwashing is a milestone of infectious disease control and public health history.[1] It has long been known to be a convenient, effective and cost-effective[2,3] means of preventing communicable diseases. Respiratory infections and diarrhoeal diseases, the major causes of death in low-income countries,[4] especially among children under five years of age,[5] are preventable by appropriate handwashing practices. The evidence from a systematic review[6] shows that handwashing with soap can reduce the risk of diarrhoeal diseases by 42–47%, and handwashing promotion could save millions of lives. A randomized controlled trial[7] showed that handwashing with soap reduced the incidence of pneumonia in children under five years of age by 50%. In China, several local studies have shown the importance of hand hygiene. A health education programme on handwashing among 87 schools in Fujian province[8] significantly reduced school absenteeism and infectious symptoms.

Despite the proven importance and benefit of handwashing, compliance with appropriate handwashing is not satisfactory, especially in developing countries which bear the greatest burden of disease. A survey[9] undertaken by the Global Public–Private Partnership for Handwashing in five Sub-Saharan African countries indicated that only 17% of children's caregivers washed their hands with soap after defaecation. In rural Shaanxi province, Zhao et al.[10] reported that 40.0% of residents washed their hands before eating and 19.2% did so after toilet use. The same situation exists among healthcare workers in hospital. A qualitative survey[11] in 25 key Chinese hospitals found that improvement of proper handwashing behaviour was badly needed but remained a critical challenge.

Many studies have focused on the determinants and indicators of handwashing behaviour, aiming to improve infection control, health literacy and health status. Individual and contextual factors are important elements. Behavioural models and theories such as the Knowledge, Attitude and Practice Model,[12] Theory of Planned Behaviour[13,14] and multiple disciplinary[15] approaches are widely applied in elucidating individual behavioural determinants of handwashing among students and healthcare workers. For environmental factors, inadequate water and sanitation sources are common reasons for poor hand hygiene in schools and rural areas.[16,17]

Previous Chinese studies on handwashing have generally been small scale and have focused on specific groups or geographical areas, such as students, healthcare workers and rural people. Data from a large-scale, qualified study of handwashing among the Chinese population are lacking. As such, the present study aimed to describe handwashing behaviour among Chinese adults and assess its association with sociodemographic and knowledge factors to provide basic data and evidence for further health education and promotion.

## Methods

### *Study design and participants*

In 2011, the Chinese Centre for Health Education/Health News Communication Centre, Ministry of Health initiated a handwashing survey in five provinces in China. The survey collected cross-sectional data on handwashing behaviour, knowledge and relative factors among adults aged 18–60 years in order to determine the current situation and provide basic data for further health intervention.

A multiple-stage, stratified sampling method was used (Fig. 1). In the first stage, five provinces were chosen from the north (Liaoning), south (Yunnan), east (Zhejiang), west (Shaanxi) and middle (Beijing) of China. In the second stage, samples were stratified by economic status. For Liaoning, Zhejiang, Yunnan and Shaanxi provinces, the candidate cities and counties in each province were listed by economic status (assessed by per-capita gross domestic product) and graded into three categories (high, middle and low). A city or county was selected at random from each category. A city separately from the high-economic and mid-economic areas of each province, meanwhile a county from a low-economic area of each province have been identified for this study. For Beijing, three districts (Xicheng, Fengtai, Huairou) were chosen to represent the three levels of stratification. In the third stage, two street districts from of each city were selected at random. Two townships were selected at random from each county. In total, 20 street districts and 10 townships of five provinces were selected as the final sampling clusters. The final sampling was stratified by gender (50% women and 50% men) and age distribution on the basis of the 2010 Chinese population census data. Households were selected at random from each street district and township. One participant aged 18–60 years was selected from each household.

### *Procedure and measures*

After each participant was recruited, a trained investigator made a home visit, accompanied by a local health professional and staff from the neighbourhood committee. Each participant completed a self-administrated paper-based questionnaire using an anonymous answer sheet following an explanation of the purpose of the study and giving their informed consent. Participants with reading difficulties were asked the questions by trained investigators. Robust quality control of field survey and data collection was conducted by professionals in the centre for health education of each province. In total, 6458 residents were invited to participate in the survey and 6159 residents completed all questionnaire items of the questionnaire (49.7% men and 50.3% women). The overall response rate was 95.4%.

The questionnaire was designed following a review of the literature, revised on the basis of expert consultation and pretested in a pilot study. It was designed to gather information on sociodemographic factors, handwashing behaviour and knowledge. Five aspects of correct handwashing behaviour (Table 1) were assessed: situations in which the hands should be washed, type of water use, use of soap, washing duration, and use of a towel. Questions asked about handwashing in six situations: 'before eating', 'after defaecation', 'after contact with a patient', 'after touching money', 'after farm labour or daily work' and 'after changing a nappy'. Each item was assessed using a five-point Likert scale ranging from 'always' to 'never'. Types of water use were: 'clean, running water'; 'water in basin used once'; or 'water in basin with