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Prevalence and relationship between gastrointestinal symptoms among individuals of different body mass index: A population-based study

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KEYWORDS

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Summary

Background: Obesity has been identified as a potential risk factor for gastrointestinal (GI) symptoms, although the data from community samples remain sparse. We assess the associations between GI symptoms and obesity in a population-based sample of Australian adults.

Method: The prevalence of 26 GI symptoms was determined by a validated postal questionnaire which was sent to 5000 randomly selected residents. The response rate was 60%. GI symptoms were classified into six broader symptom groups based on the Rome II Criteria – abdominal pain, esophageal symptoms, dysmotility symptoms, diarrhea, vomiting, and constipation. Obesity was defined according to body mass index using self-reported height and weight.

Results: The prevalence of obesity (BMI ≥ 30 kg/m²) was 25.1%; 36.1% were overweight. There were significant and positive univariate associations between obesity and abdominal pain (OR = 1.75; 95% CI: 1.39–2.21), esophageal symptoms (OR = 1.74; 95% CI: 1.36–2.22), dysmotility symptoms (OR = 1.43; 95% CI: 1.16–1.77) and diarrhea (OR = 2.01; 95% CI: 1.65–2.45). The adjustment for socioeconomic characteristics and eating behaviors had minimal effect on the associations for abdominal pain (OR = 1.34; 95% CI: 1.01–1.79), esophageal symptoms (OR = 1.35; 95% CI: 1.03–1.78), and diarrhea (OR = 1.86; 95% CI: 1.49–2.31); however, the association

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between obesity and dysmotility symptoms became non-significant. Obesity was not related to constipation.

Conclusion: Obesity is an independent risk factor for abdominal pain, esophageal symptoms and diarrhea, but is not associated with dysmotility symptoms or constipation.

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Introduction

Obesity is a major health problem worldwide [1–3]. It is linked with cardiovascular disease, metabolic conditions such as diabetes mellitus, respiratory conditions, fertility, skin diseases, psychological conditions, liver disease, musculoskeletal conditions and certain cancers [4,5]. In these areas of medicine there has been much research both experimental and epidemiological, however, there are little data regarding the effects on the gastrointestinal system.

Several studies have assessed gastrointestinal symptoms in obese individuals [6–14], but there remains a lack of good epidemiological data on the frequency of these symptoms and the impact they have on obese individuals. The majority of studies have been undertaken in the United States [6,7,11,13] with a couple of European studies also published [10,12], a birth-cohort study from New Zealand [8] and an Australian study that was not adequately powered and only assessed 10 gastrointestinal symptoms [9]. More detailed gastrointestinal symptom data and larger sample size would strengthen any associations detected among obese individuals.

Therefore, we aimed to determine the prevalence and relationship between upper and lower gastrointestinal symptoms and obesity in a large population-based sample of individuals in Australia. The hypothesis was that obese individuals would experience a greater burden of gastrointestinal symptoms than other body mass index groups.

Methods

Subjects

This study was approved by the Sydney West Area Health Service (SWAHS) Ethics Committee. A total of 5000 adult subjects (≥ 18 years) were randomly selected from the electoral rolls of all local government areas (LGA's) included in the region covered by the Sydney West Area Health Service. All citizens aged 18 years and over are included on the electoral rolls in Australia.

Subjects come from the SWAHS catchment (see below) area which consists of a population of 307,787 (7.7% of the Sydney population) and is socio-demographically very similar to the Australian population according to 2006 Census data, except that its inhabitants are slightly younger (32 vs. 37 median years) and it has a slightly higher socioeconomic status based on income (\$1285 vs. \$1171 median individual income per week), respectively. Ethnic status (those born overseas) was similar (22.2% vs. 20.5%), with the majority Caucasian based on Australian Bureau of Statistics data (www.abs.gov.au).

Procedures

A letter was sent to all randomly selected individuals. This letter outlined the study and requested participation. Included with the letter was the validated Bowel Symptoms Questionnaire (BSQ) [15]. A reminder letter was sent 3 and 6 weeks after the initial mail-out. At week 6 this included another questionnaire. The survey was closed at 10 weeks. A prepaid return envelope was included to allow subjects to return the completed questionnaire. Subjects who indicated at any point that they did not wish to participate were not contacted further. A database linking record numbers to identifying information (e.g. names and addresses) was stored on a secured and password protected computer.

Of the 5000 people in the general community to whom we sent the questionnaire, a total of 2935 questionnaires were returned (complete and incomplete). There were 142 questionnaires sent back for various reasons (e.g., death, gone overseas, did not want to participate, wrong address, mentally ill, too sick to participate and in jail). The response rate was 60% with 54% being female.

Definitions

The World Health Organization (WHO) definition of obesity is based on the body mass index (BMI), which is calculated by measuring the individual's weight in kilograms and divides this by height in meters

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