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Knowledge, attitude and recommendations for practice regarding dengue among the resident population of Queensland, Australia



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ABSTRACT

Objective: To investigate levels of awareness of dengue among the inhabitants of Queensland (QLD), a dengue-prevalent state in the north east of Australia.

Methods: A computer-assisted telephone interviewing survey was conducted in mid 2014. A total of 1223 randomly selected respondents (≥ 18 years) across QLD completed a structured questionnaire covering all aspects of dengue.

Results: 97.55% had heard of dengue and participated further. Among them, 54.70% had travelled overseas (48.11% to dengue-risk countries) in the last five years. A total of 94.47% said transmission is by mosquito bite. In addition, 84.83% knew of current transmission of dengue in QLD, while 80.97% knew the focus is Far North and North QLD. Furthermore, 2.35% and 8.97% had experienced an infection in their life or that of their immediate family/partner, respectively. 85.03% identified correctly at least one means of prevention. A total of 69.72% advised to use insect repellent, wear covered clothing and avoid visiting mosquito-prone areas while 20.93% advised fumigation and clearing water containers around residences. There was a significant difference ($P < 0.05$) between residents of South East QLD and the rest of QLD regarding knowledge of prevention. However, such awareness was not affected significantly by overseas travel ($P > 0.05$).

Conclusions: Although many people throughout QLD have heard of dengue, about 15% appear unaware of local transmission, its symptoms and of methods to reduce risk of infection. A lack of knowledge regarding prevention of mosquito breeding is evident in South East QLD, where dengue is not currently reported. The study suggests that future dengue awareness campaigns should target communities in both endemic and potentially endemic areas throughout Queensland.

1. Introduction

Dengue, a mosquito-borne viral disease of humans, has in recent years drawn increased worldwide public health concern.

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The study protocol was performed according to the Helsinki declaration and approved by the Human Ethics Research Review Committee of Central Queensland University. A confidentiality agreement was signed by each survey interviewer and informed verbal consent was obtained from each participant.

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Over 3.6 billion inhabitants of the tropics and subtropics are currently at risk of infection [1], with an estimated 390 million dengue infections reported per year in around 130 countries worldwide [2,3]. The causative agent of the disease is the enveloped, icosahedral, single stranded positive-sense RNA virus dengue, a member of the family Flaviviridae and genus *Flavivirus*. Based on differences in antigen neutralization tests five serotypes (DENV-1 to DENV-5) are now recognized [4]. The mosquito species that are principally responsible for dengue transmission, *Aedes aegypti* and *Aedes albopictus* [5], are distributed mainly in tropical localities, including the Asia–Pacific region, in parts of which it is endemic [6]. The nature of disease ranges from mild self-limiting illness, dengue with warning signs (abdominal pain, persistent vomiting, fluid accumulation, mucosal bleeding, lethargy, increasing haematocrit with decreasing platelets), to severe dengue (dengue with severe plasma leakage, severe bleeding, or organ failure) [7].

Despite decades of intensive research, the present unavailability of an effective antiviral drug and/or licensed vaccine makes dengue a major global public health priority [8,9].

Dengue is an emerging concern in Australia. There have been occurrences of infection in Queensland (QLD) for many years, with local transmission resulting in multiple outbreaks in Northern QLD [10,11]. A major outbreak in March 2009 and continuing sporadic incidences have further alerted state authorities to the public health risk posed by dengue. A large outbreak of DENV-2 in 1992–93 has left a sustained potential threat. In the intervening period, there have been more than 40 outbreaks comprising 3086 confirmed cases and causing three deaths [12]. The number of overseas travel-associated cases of dengue, almost 10 times higher than locally acquired, continues to increase annually: 1390 in 2011–12; 1133 in 2010–11; 593 in 2009–10; 350 in 2007–08 [13,14].

In response to the real and perceived threat to the resident population of QLD, the State Government has launched successive dengue management plans, the most current iteration of which concludes soon [15]. However, risk of outbreak is always amplified when communities are not aware of the disease. In spite of the long history of dengue in this state, it was our anecdotal belief that local people lack sufficient awareness of the virus, its route of transmission, and the disease it causes. Thus, the aim of the present survey was to investigate knowledge of and attitude towards dengue among the people of QLD. Awareness level is an extremely important factor in determining a strategy for future public health policies. Without this information, scarce resources for rural and regional health may easily be directed towards information campaigns that do little to alter the community's current understanding of preventive measures. Hence, this study holds pragmatic value to policy makers of QLD for implementing a public health information drive to assist in the reduction, and ultimately prevention, of dengue in QLD. Also, it provides a useful point of reference for health educators in countries of the Western Pacific, North America and Europe, where, similar to Australia, dengue poses an increasing threat.

2. Materials and methods

The survey was conducted by a highly experienced team of trained telephone operators from the 2014 Queensland Social Survey (QSS 2014). This was the tenth annual state-wide survey administered by the Population Research Laboratory (PRL) based at the Rockhampton campus of Central Queensland University. The QSS is an omnibus-style survey of households in QLD that is acknowledged to provide a structured research framework that serves as a reliable, credible, and relatively low-cost data collection vehicle.

2.1. Survey instrument

The survey consisted of three components: 1) a standardized introduction; 2) socio-demographic questions; and 3) questions that specifically addressed the interests of the researchers participating in the study, including awareness of dengue which constituted our research study. For the second component, information was requested on household composition, gender, age, marital status, highest level of education, household

income, religion, ethnicity, employment status, occupation, home ownership and sample area. For the third component, a structured questionnaire of nine standard questions, carefully designed to cover all aspect of awareness of dengue among residents of QLD, was used. Our research hypothesis was that awareness of dengue is influenced by the geographical location of residence and overseas travel history of an individual.

The set of survey questions focused on dengue epidemiology in the state, mode of transmission and vector control methods along with participants' place of origin and travel history. Trained interviewers trialled the entire questionnaire on 68 households in QLD selected at random. Minor amendments to improve text of questions were made after review of pre-test frequency distributions and feedback from interviewers (*e.g.* comments on effect of question order on responses, inappropriate response categories, ambiguous wording).

Approval for QSS 2014 was received from the Human Ethics Research Review Committee at Central Queensland University prior to its conduct with the QLD general public. The authorized application was Project H13/06-120 Queensland Social Survey 2014.

2.2. Sampling design

For sampling purpose the state of QLD was delineated into two areas for telephone interviewing: South East QLD (SEQ); the remainder of QLD (non-SEQ). QLD is the second largest and third most populous state in Australia. Among an estimated 4.75 million population, more than two thirds (3.20 million) live in SEQ, which includes the state capital Brisbane, and the metropolitan regions of Gold Coast, Sunshine Coast and West Moreton. The remainder of QLD is sparsely populated and regional or rural [16]. In order to permit the analysis of each area as a separate entity, a minimum sample size of 400 for each sub-region was deemed necessary.

A two-stage selection process was used to register participants: selection of households and selection of respondent gender within each household. The target population designated for telephone interviewing was all persons 18 years of age or older who, at the time of the survey, were living in as their usual place of residence an abode in QLD that could be contacted via a direct-dialled, landline telecommunications connection. A random selection approach assured that each respondent had the same likelihood of being contacted. The PRL used a telephone database of randomly generated landline telephone numbers which had been selected using postcode parameters and washed to remove known non-residential and non-working numbers. Each household was randomly pre-selected as either a male or female household. Within the household, one eligible person was selected as the respondent for the interview. If there was more than one male/female in the household then the male/female that had the most recent birthday was selected. If there was no one of the pre-selected gender residing in the house then the house was designated not qualified.

2.3. Data collection

QSS 2014 was performed utilising a twenty-station computer-assisted telephone interviewing (CATI) system linked to a local area network at the PRL. This facility enabled information

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