CHAPTER I

INTRODUCTION

Acute gastroenteritis (AGE) is one of the most common causes of morbidity and mortality in all age groups worldwide. Globally, approximately 1.5 billion episodes and 1.5 to 2.5 million deaths annually in children under five years of age are estimated to be associated with AGE, the majority are occurring in developing countries (King et al., 2003). Viral gastroenteritis is an infection caused by a variety of viruses. Since 1972, numerous viruses were discovered as the causative agent of nonbacterial gastroenteritis. Among the enteric diarrheal viruses, rotavirus is considered as the major etiologic agent of diarrhea (Parashar et al., 1998, 2006, 2009). Moreover, the association of other enteric viruses such as caliciviruses (norovirus, sapovirus), astrovirus and adenovirus have also been reported in sporadic and outbreak cases of diarrhea (Clark and Mckendrick, 2004; Akihara et al., 2005; Sumi et al., 2005; Shimizu et al., 2007). In recent years, several novel viruses have been discovered, mostly by advanced molecular screening methods (Svraka et al., 2010; Khamrin et al., 2011). Recently, human parechovirus, Aichi virus, and enterovirus have been considered as agents associated with AGE by molecular screening method (Yamashita et al., 2000; Pham et al., 2010a, 2010b, 2011a, 2011b).

Globally, the epidemiological studies in various countries have shown that the diarrheal virus infection rate in children with diarrhea appeare to be vary among different geographical regions, such as rotavirus varied from 22% to 52% (Khamrin et

al., 2006; Van Damme et al., 2007; Bozdayi et al., 2008; Lee et al., 2009; Khananurak et al., 2010; Li et al., 2010; Mladenova et al., 2010), norovirus from 4.5% to 56% (Buesa et al., 2002; Lopman et al., 2003; Reuter et al., 2005; Ike et al., 2006; Dey et al., 2007; Ferreira et al., 2010; Oldak et al., 2011), sapovirus from 1.3% to 19.2% (Buesu et al., 2002; Bon et al., 2005; Phan et al., 2007; Harada et al., 2009), astrovirus from 1.3% to 13.9% (Santos et al., 2007; Nguyen et al., 2008; Malasao et al., 2008; Soares et al., 2008; Jeong et al., 2011), adenovirus from 3.6% to 13.7% (Lennon et al., 2007; Akan et al., 2009; Banyai et al., 2009; Sdiri Loulizi et al., 2009), human parechovirus from 8.1% to 18.2% (Benschop et al., 2008; Baumagarte et al., 2008; Tapia et al., 2008; Pham et al., 2010b, 2011a, 2011b), Aichi virus from 1.6% to 6.5% (Yamashita et al., 1995, 2000; Sdiri-Loulizi et al., 2008; Reuter et al., 2009), and enterovirus at 3.1% and 16.6% (Harada et al., 2009; Pham et al., 2010a) whereas, few epidemiological studies of diarrheal viruses have been conducted in adults with diarrhea (Anderson and Weber, 2004). Epidemiologic and genetic studies of diarrheal viruses causing gastroenteritis in adults revealed that the prevalence of rotavirus varied from 5% to 63% (Sanekata et al., 2003; Rubilar-Abreu et al., 2005; Feeney et al., 2006; Pietruchinski et al., 2006; Uchida et al., 2006; Wang et al., 2007; Carraro et al., 2008; Paul et al., 2008; Aung; et al., 2009; Wang et al., 2009; Tatte et al., 2010), norovirus from 11.9% to 26.6% (Gao et al., 2011; Liu et al., 2010; Tan et al., 2010; Lopman et al., 2011), sapovirus from 0.5% to 35.7% (Podkolzin et al., 2009; Yoshida et al., 2009; Liu et al., 2010; Yamashita et al., 2010), astrovirus at 2.0% (Podkolzin et al., 2009; Liu et al., 2010), and adenovirus at 1.8% (Podkolzin et al., 2009). For the epidemiological studies of Aichi virus, human parechovirus, and enterovirus, the detections in adults with diarrhea have never been reported.

In Thailand, the epidemiological studies of diarrheal viruses in adults are much less frequent than those in children. During 1980-1981, Echeverria et al. (1983) had reported the study of rotavirus infection in patients over 15 years of age admitted to Bamrasnaradura

hospital, Nonthaburi, were examined for rotavirus by ELISA. Rotavirus was identified as the only etiological agent in 5% of patients (28 of 526), and only 2 of 28 with rotavirus infections had known to contact with young children with diarrhea. That was the only report of rotavirus infection in adults in Thailand, which was about 30 years ago. In contrast, most of diarrheal viruses studies in Thailand, particularly in Chiang Mai province were focused on pediatric patients with diarrhea. For instance, the studies of diarrheal viruses in Chiang Mai province during 2000-2007 demonstrated that children admitted to hospital with diarrhea were infected with rotavirus at 24.2% to 37.3% (Khamrin et al., 2006, 2007a), norovirus at 6.8% to 19.9% (Khamrin et al., 2007b; Malasao et al., 2008; Khamrin et al., 2010), sapovirus at 1.2% to 4.3% (Khamrin et al., 2007b), astrovirus at 2.4% (Malasao et al., 2008; Chaimongkol et al., 2012), adenovirus at 1.3% (Chaimongkol et al., 2012), human parechovirus at 14.6% (Pham et al., 2009), enterovirus at 3.8% (Chaimongkol et al., 2012), Aichi virus at 0.9% (Pham et al., 2007), whereas none of the study was done in adult patients. Therefore, it is of interest, to investigate the molecular epidemiology of diarrheal viruses in adults with diarrhea, in Chiang Mai, Thailand.