

*Streptococcus pyogenes* or group A streptococcus (GAS) is a gram-positive bacterium transmitted primarily through respiratory droplets, or skin contact with broken skin that has secretions from infected sores on the skin. Foodborne GAS transmission also exists. Additionally, the environment is also a potential reservoir and facilitates transmission through contaminated equipment, surfaces, dust and fomites. GAS is responsible for causing a range of infections that include rheumatic fever, necrotising fasciitis, post streptococcal glomerulonephritis, pharyngitis, strep throat and scarlet fever. These infections are classified as either mild or invasive. Anyone in a population can be infected by GAS. However, the immunocompromised, children 5-15 years old, the elderly and pregnant women are at most risk of these infections.

GAS is endemic among Indigenous communities in Australia with the prevalence rate ranging from 23.9 to 82.5 cases per population of 100,000 people. This has been attributed to factors including low socioeconomic status, characterised by overcrowding and poor housing conditions. This research was undertaken, in part, to inform health care workers in a remote community that had expressed concern about the lack of information available about the risk factors of GAS. Since GAS infections are not nationally notifiable in Australia, their control and prevention has faced challenges. Making GAS notifiable at the national level would help to inform public health and research initiatives aiming to reduce the impact of this condition.

An extensive literature review was undertaken to examine all published studies from the past ten years that identified group A streptococcus infections, their risk factors and the prevention and control strategies in place for the control of these bacteria. The findings showed that GAS infections exist with higher prevalence among the Indigenous populations and that the incidence of the infections has its peak during childhood. Schools, hospitals and residential care homes were also found to be high risk areas for the transmission of the infections. This literature review also highlighted the current prevention and control measures in place for GAS transmission. Hand and personal hygiene were reported to be key in prevention of these infections.

Hand hygiene can be achieved through hand washing with soap and water or use of hand sanitisers. The effectiveness of hand sanitisers in the destruction of pathogenic microorganisms varies depending on different factors. Samples of hand sanitisers available in the local supermarkets were purchased and tested in August 2020. A total of five samples were purchased. Four samples were hand sanitisers: the fifth sample was a dish washing liquid, used as a comparison. All samples were tested for their effectiveness in the destruction of GAS bacteria using a bacteriological culture method. Results of the study showed that three of the four hand sanitiser samples tested, and the dishwashing liquid, demonstrated a log

reduction of log 7 and were therefore effective in killing *S. pyogenes*. One hand sanitiser sample recorded a log reduction of log 1, which indicates its inability to effectively kill *S. pyogenes*.

Future research should involve a bigger sample size to determine the effectiveness of more brands of available hand sanitisers. Further testing of hand sanitisers that are ineffective in killing *S. pyogenes* should also be done. Testing of the effectiveness of alcohol-free hand sanitisers on the destruction of GAS should also be undertaken. Additionally, this kind of testing should be done on high touch surfaces to determine whether disinfection methods effectively destroy GAS. Swabs can be collected from the hands of the people at most risk to determine presence and numbers of GAS microorganisms on their hands before and after the use of different brands of hand sanitisers, to determine their effectiveness. To determine the effectiveness of hand hygiene in control of GAS infections, work involving comparison of morbidity due to GAS before and after implementation of hand hygiene using hand sanitisers, or a combination of both hand hygiene techniques, in populations which are more susceptible to GAS infections, should also be done.

These findings, coupled with the literature review, show the importance of understanding GAS disease risk factors and the feasible community prevention and control measures. The findings will ensure reduced disease morbidity and mortality and therefore improved quality of life in populations of at-risk individuals.