

UNIVERSITI TEKNOLOGI MARA

**AN INVESTIGATION ON
PHYSICO-CHEMICAL AND
MICROBIAL WATER QUALITY OF
PUBLIC SWIMMING POOLS IN
SEREMBAN**

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In the name of Allah, The Most Gracious, The Most Merciful.

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ABSTRACT

A variety of microorganisms can be found in public swimming pools, which may be introduced in the pool water in a number of ways. In many cases, the risk of illness or infection has been linked to faecal contamination of the water, due to faeces released by swimmers or a contaminated source water or, in outdoor pools, may be the result of direct animal contamination (e.g. from birds and rodents). The physico-chemical (temperature, residual chlorine, turbidity, pH, and total dissolve solids) as well as microbiological (total coliform, *pseudomonas aeruginosa* and *staphylococcus aureus*) were analyzed, and the results were compared with the WHO standards. The mean of residual chlorine was 1.66 (± 0.81), the mean of pH was 7.57 (± 0.23), the mean of turbidity was 0.60 (± 0.49), the mean of total calcium (as CaCO_3) was 158.16, the mean of TDS (Total Dissolved Solids) was 858.69, all the cyanuric acid levels were below 5 and the mean of nitrate was 1.90. However, there was no presence of total coliform, *staphylococcus aureus* and *pseudomonas aeruginosa* in public swimming pool. The results of the study are expected to provide a guidance to the swimming pool operators and owners in ensuring that the swimming pool quality is well managed. The knowledge and practice of the swimming operators were also investigated. Pearson Correlation method was used to identify the relationship between the knowledge and practice. It can be concluded that there was a strong correlation which is 0.687 and there is a statistical significant ($p < 0.05$) between knowledge and practice of the swimming operators at public swimming pool.

Keywords: *Outdoor swimming pools, water quality, knowledge and practices, swimming pool operators*

CHAPTER ONE

INTRODUCTION

1.1 Background

The swimming pool is a premise that allows the public to have an enjoyable moment during their leisure time as it offers physical activities and water recreation that include rehabilitation therapy, water aerobics and of course, swimming (Gallè et al., 2016). Swimming pools can act as the vehicles that transfer microbial infectious disease and waterborne pathogens. Some of the bacteria that can be found in the swimming pool premises are *pseudomonas aeruginosa*, *staphylococcus aureus*, and *escherichia coli*. If the water in the swimming pool is poor treated, the swimming pool users can be exposed to different types of diseases. Those diseases include gastrointestinal diseases (gastroenteritis, cholera), eye diseases (conjunctivitis, eye irritation), skin diseases (water ripples, scabies), and other diseases (salmonellosis, folliculitis, asthma or flu), as reported by Ekopai et al. (2017). The swimmers' secretions found in the swimming pools are shed from saliva, nasal secretions, urine, sweat, fecal are the reason why the public swimming pool water are contaminated (Rabi et al. (2007)).

Unsafe swimming pool water due to poor sanitation and improper hygiene practices in the public swimming pools, are the causes of the possible distribution of infectious diseases to the pool users (Nikaeen, Hatamzadeh, Vahid Dastjerdi, & Hassanzadeh, 2009). Amid occupied periods, the nature of pool water might be harmed. Undoubtedly, swimmers expose to microbial contamination microorganisms and natural substances (pee,