International Journal of Advance Research in Community Health Nursing

E-ISSN: 2664-1666
P-ISSN: 2664-1658
www.communitynursing.net
IJARCHN 2020; 2(2): 106-110
Received: 10-04-2021
Accepted: 30-05-2021

Dayana BAA
Department of Medical Surgical Nursing, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Swetha M
B.Sc. (N) Final Year, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Vasanthra Devi S
B.Sc. (N) Final Year, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Veni A
B.Sc. (N) Final Year, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Corresponding Author:
Dayana BAA
Department of Medical Surgical Nursing, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Assess the knowledge on candida and aspergischia white (fungal infection) among adult residing in porur, Thiruvallur district

Dayana BAA, Swetha M, Vasanthra Devi S and Veni A

Abstract
Fungal infections, also called mycoses, are important causes of morbidity and mortality in humans. Some fungal infections are endemic, and these infections are usually caused by fungi that are present in the environment and whose spores enter humans. The present aim was to assess the knowledge on Candida and Aspergischia White (fungal infection) among adults residing in Porur. A quantitative approach Non-experimental research design was used for the present study. 150 adults were selected using Non-probability Purposive Sampling Technique. Self-structured questionnaire method was used to collect to assess level of knowledge on Candida and Aspergischia White (fungal infection) among adults, mean score was found to be 10.5 with standard deviation 2.620 with minimum score is 6.0 and maximum score 15.0. The demographic variables such as education and source of information shows significant association with level of knowledge at level of $P< 0.01$. The result revealed that 114(76.0%) had inadequate knowledge, 36(24.0%) had moderate knowledge and none of them had adequate knowledge. Hence the findings of present study revealed that, lack of knowledge among adults and to foster the practice of health education to improve the knowledge on Candida and Aspergischia White (fungal infection).

Keywords: Knowledge, candida, aspergischia white (fungal infection), adults

Introduction
Starting a few months ago, the coronavirus disease-2019 (COVID-19) has become pandemic and already resulted in more than 25 million confirmed cases worldwide, including over 850,000 associated deaths. Older age, hypertension, chronic obstructive pulmonary disease, diabetes and cardiovascular disease are the main risk factors presented for severity and mortality in COVID-19 [1, 2]. Patients with severe COVID-19 infection requiring intensive care may also be challenged to battle against other coexisting infectious agents, such as other respiratory viruses (e.g. influenza), gram-positive and gram-negative bacteria and fungi (both yeasts and filamentous fungi). As an obvious consequence, secondary infections and/or co-infections in the context of COVID-19 patients are important factors affecting hospitalization time, illness severity and mortality [3, 4]. Corroborating this statement, we have witnessed increasing reports on the co-occurrence of respiratory viruses, like influenza epidemics/pandemics, and secondary invasive fungal infections, resulting in poor patient outcome and, consequently, high mortality rates. Therefore, this critical reality demands an urgency for special focus on different aspects of this new disease [5-7]. It has been established that the activation of antiviral immunity in the host tissue of infected patients (in COVID-19-positive patients, lungs are the main affected organs) can provide a desirable environment for the establishment, growth and development of different classes of microorganisms. For instance, a substantial increase of fungal infections (e.g. candidiasis, aspergillosis, cryptococcosis, pneumocystosis, histoplasmosis) has been detected in individuals with active infection caused by the human immunodeficiency virus (HIV), severe flu and COVID-19 [6-8].

Covid-19 -Aspergillus
Like severe flu, COVID-19 progression leads to the manifestation of acute respiratory distress syndrome (ARDS), which predisposes patients to secondary pulmonary aspergillosis. This is an infection caused by Aspergillus, a worldwide distributed filamentous fungus.

Aspergillus spores are typically present in the environment; so, they can easily enter the airway system and, subsequently, they reach the human lung tissue and/or paranasal sinuses by breathing. Aspergillus causes a wide range of infection with various clinical manifestations ranging from localized to disseminated diseases. For instance, invasive aspergillosis typically affects severely immunocompromised patients occasionally as a result of organ transplant, cancer treatment (due to the chemotherapy and/or radiotherapy), neutropenia and long-term treatment with corticosteroids. In addition, allergic forms of aspergillosis (e.g., allergic broncho pulmonary aspergillosis - ABPA) are implicated in asthma exacerbation and bronchitis in individuals with hyperactive immune responses as well as in cystic fibrosis patients [11, 12]. Invasive aspergillosis caused by Aspergillus species (e.g., A. fumigatus, A. Niger, A. flavus, A. terreus) carries an overall 30 to 95% mortality rate even if it isearly diagnosed and despite antifungal treatment approaches [13]. Some studies from China reported high rates of aspergillosis among COVID-19 patients [9, 10, 14, 15]. A retrospective study from an ICU in Wuhan showed the isolation of A. flavus and A. fumigatus from respiratory tract secretions in two out of seven (28.6%) patients with hospital acquired pneumonia [16]. In another retrospective study conducted in two hospitals of Wuhan regarding 85 fatal cases of COVID-19, fungal culture from sputum obtained from 9 patients were reported positive in 33.3% of cases with 8 (9.4%), 3 (3.5%) and 2 (2.4%) patients receiving voriconazole, fluconazole and caspofungin [15]. However, in all the studies from China fungal infections were poorly defined and for such reason it appears difficult to make any inference. European countries such as France, Germany, Belgium and The Netherlands have recently reported high rates of chronic pulmonary aspergillosis among COVID-19-positive patients with a prevalence index of 20-35% [17-26]. A case report from Brazil, which diagnosed a patient infected with A. penicillioides postmortem, pointed out the importance of considering invasive pulmonary aspergillosis in patients with underlying severe COVID-19 [27]. An observational study from Pakistan showed that Aspergillus spp. were isolated from tracheal aspirates of 39.1% COVID-19-positive patients and, in this fraction, 21.7% were diagnosed with aspergillosis and 17.4% were only considered colonized[28]. In this scenario, the most commonly used drugs are the new triazolesvoriconazole and isavuconazole followed by less common cases treated with liposomal amphotericin B and caspofungin [29]. These findings and other previous reports highlight that many cases may remain undiagnosed, since standard culture methods exhibit limited sensitivity. Consequently, the appropriate therapy is not achieved on time and clinical failure outcomes are usually reported [30].

COVID-19 - Candida

Fungal infections caused by yeasts can also occur in patients with ARDS, including COVID-19, as a result of impaired immune system functions. Invasive candidiasis is an important health care-associated fungal infection responsible for high mortality rates and it is caused by several opportunistic species belonging to the Candida genus, with Candida albicans as the most common species [31]. Data from a hospital in Spain pointed out a rising incidence of invasive candidiasis in COVID-19 positive patients, with an associated mortality of 40% [32]. Invasive candidiasis by C. albicans was similarly reported in COVID-19 patients requiring critical care in United Kingdom hospitals [3]. A case report from Austria described a secondary catheter-related candidiasis caused by C. glabrata successfully treated with caspofungin for 14 days [33]. Likewise, in another published work, Candida spp. was one of the most frequently fungi identified in the bloodstream of patients using central venous catheters during COVID-19 pandemic episodes in New York City, USA [34].

According to recent studies, the majority of Candida species recovered from COVID-19 patients were isolated from the oropharynx. Oropharyngeal candidiasis is a localized mucous membrane infection, which is characterized by invasion and damage of oral epithelial cells [35]. Candida spp. and other yeasts were isolated from the respiratory tract in 21.4% of positive cases of co-infection during the first pandemic of COVID-19 in two hospitals in the United Kingdom [3]. A retrospective study in Italy evaluated the respiratory specimens of hospitalized COVID-19 patients in ICU. The results showed that almost 52% of cultures were positive for bacteria and fungi (C. albicans and C. glabrata) [36]. Additionally, in a study conducted in Iran, the authors reported that C. albicans was the most frequent fungus followed by other species isolated from oral lesion of COVID-19-positive patients suffering from oropharyngeal candidiasis. Interestingly, those Candida isolates were susceptible to all tested antifungal drugs [37].

Materials and Methods

A quantitative research approach with Non-experimental research design was adopted for the present study. Before commencing the data collection, authorized setting permission was obtained from the higher authority of selected community area Porur, Thiruvallur district the study was conducted. A total of 150 adults range from 18 to 40 years residing in Porur who met the inclusion criteria were selected by using Non-probability purposive sampling technique. The inclusion criteria for the study participants were the adult age should be ranges from 18 to 40years.The exclusion criteria for the study participants were the adult who don't understand Tamil and English language. The purpose of the study was explained by the investigator to each of the study participants and a written consent was obtained from them. The demographic data and existing level of knowledge was collected by using a self-structured questionnaire regarding Candida and Aspergischia White (fungal infection) and the collected data were tabulated and analyzed by using descriptive and inferential statistics.

Results and Discussion

Section A: Description of the demographic variables of adults residing at Porur

The table despites that 50% were in the age group of 18-30 years, 57.3% were males, 74.7% were Hindu, 58% were married, 64.7% had high school education, 65.3% were earning income in range of 10,000-15,000 per month, 62.7% were recently affected by covid-19, 37.3% were gained information through T.V and internet.

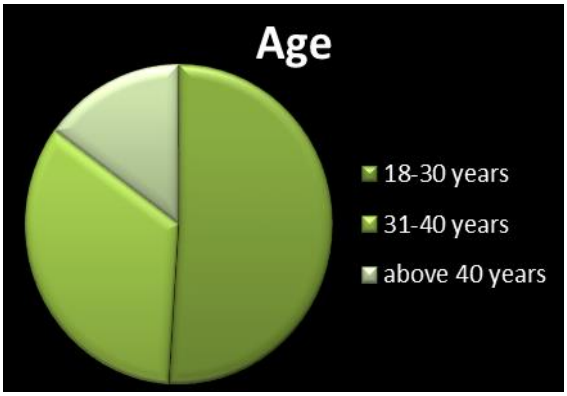

Fig 1: Frequency and percentage Distribution of age

A.M. Ignatovic *et al.*, (Sep 2018) a study on invasive fungal infections in Serbia: knowledge, attitudes and practice of physicians, a cross-sectional questionnaire based study was performed. The study was conducted from November 2016 to April 2017. Total of 220anonymous self- administrated questionnaires were applied. Participants were physicians from Clinics of the Clinical center Nis (Hematology, Oncology, Urology, Pulmology, Surgical wards and ICUs) and from the Public Health Institute Nis (IPH). In order to compare how answers in the questionnaire vary according to participants' characteristics, the parametric t- test and non-parametric chi square test were used the result shows that Low number of physicians completed the questionnaires and response rate was 37% (82/220). The average age of physicians was 44.19 ± 10.72 (ranged from 25 to 65). Mean age and years of clinical practice were 16.74 ± 10.07 (ranged from 1 to 39). Correct answers about basic epidemiology characteristics of Candida knew statistically significant number of physicians both from IPH and from clinics. Less than a quarter of physicians gave the right answers about the risk factors for the infection with Candida. Physicians from Clinics gave statistically significant more correct answers about practical problems due to Candida spp. and Aspergilus spp. caused infection than physicians from the IPH (P = .352). The majority of the physicians from clinics (74.2%) knew that fluconazole is mostly recommended antifungal agent for prophylaxis, however, statistical difference was established among different physicians' category (P = .006). More than two-thirds of examined physicians knew about antifungal prophylaxis with fluconazole, but only 37%of them used it in everyday practice. There was significant difference between answers regarding practice of anti-fungal prophylaxis, in percentage of correct answers regarding the risk factors for Candida infections and antifungal prophylaxis in everyday practice. The physicians with average age years of clinical practice ≤ 10 significantly less applied antifungal prophylaxis in practice (P= .013); physicians aged 35-44 vs 45-54 had the higher percentage of correct answers regarding the risk factors for Candida infections (P= .004). The study concluded, this is the first study in Serbia about knowledge, attitudes and practice of physicians about IFIs. Physicians had generally good knowledge about epidemiology of fungal infection, positive attitudes.

Section B: Assessment of current level of knowledge about candida and aspergischia white (fungal infection) among adults

Table 1: Frequency and percentage distribution of level of knowledge on Candida and Aspergischia white (fungal infection)

Variables	Inadequate		Moderate		Adequate	
	No.	%	No.	%	No.	%
Level of knowledge	114	76.0	36	24.0	-	-

The table shows that 114(76.0%) had inadequate knowledge on candida and aspergischia white (fungal infection) among adults, 36(24.0%) had moderate knowledge and none of them had adequate knowledge.

Table 2: Minimum score, Maximum score, mean and standard deviation on level of knowledge on salivary biomarker N = 150

Knowledge	Mean
Minimum Score	6.0
Maximum Score	15.0
Mean	10.5
Standard Deviation	2.620

The table despites that the minimum score is 6.0 and maximum score 15.0 and mean and standard deviation of the data is 10.5and 2.620.

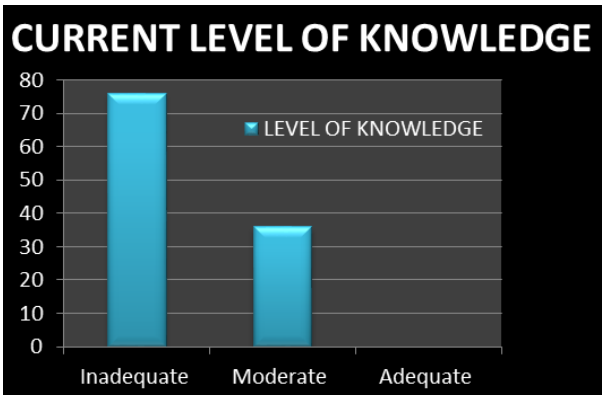

Fig 2: Percentage distribution on level of knowledge on candida and aspergischia white (fungal infection) among adults

Rita Oladele, Akaninyene Asuquo Otu *et al.*, (Aug 2020) conducted a cross-sectional study on evaluation of knowledge and awareness of invasive fungal infections amongst resident doctors in Nigeria, multicentre survey across 7 tertiary hospitals in 5 geopolitical zones of Nigeria between June 2013 and March 2015. Knowledge, awareness and practice of Nigerian resident doctors about the diagnosis and management of invasive fungal infections were evaluated using a semi-structured, self-administered questionnaire. Assessment was categorized as poor, fair and

good. The results shows that 834(79.7%) of the 1046 participants had some knowledge of IFIs, 338(32.3%) from undergraduate medical training and 191(18.3%) during post-graduate (specialty) residency training. Number of years spent in clinical practice was positively related to knowledge of management of IFIs, which was statistically significant ($p< 0.001$). Only 2 (0.002%) out of the 1046 respondents had a good level of awareness of IFIs. Only 4(0.4%) of respondents had seen > 10 cases of IFIs; while 10(1%) had seen between 5-10 cases, 180(17.2%) less than 5 cases and the rest had never seen or managed any cases of IFIs. There were statistically significant differences in knowledge about IFIs among the various cadres of doctors ($p< 0.001$) as level of knowledge increased with rank/seniority. The study concluded knowledge gaps exist that could militate against optimal management of IFIs in Nigeria. Targeted continuing medical education (CME) programmes and a revision of the postgraduate medical education curriculum is recommended.

Section C: Association of level of knowledge with selected demographic variables

Table 3: Association of level of knowledge with selected demographic variables of study population

Demographic Variables	Inadequate		Moderate		Adequate		Chi-Square Test
	No.	%	No.	%	No.	%	
5.Education							χ^2=17.1847 d.f=2 p= 0.01855 S*
Illiterate or primary school	81	54.0	24	16.0	-	-	
High school or intermediate or diploma	30	20.0	4	2.7	-	-	
Graduate or post graduate	3	2.0	8	5.3	-	-	
8.Sources of information							χ^2=12.497 d.f=2 p=0.001933 S*
Newspaper and books	55	36.7	28	18.7	-	-	
T.V and internet	45	30.0	4	2.7	-	-	
From Neighbours	14	9.3	2	1.3	-	-	

The table shows that, demographic variables such as, education and source of information shows significant association with level of knowledge on Candida and Aspergischia white (fungal infection) among adults at level of $p<0.01$.

Conclusion

The findings of the present study revealed that, the level of knowledge on Candida and Aspergischia White (fungal infection) among adult (below18-above40) years residing in Porur, 114(76.0%) had inadequate knowledge on Candida and aspergischia white (fungal infection) among adults, 36(24.0%) had moderate knowledge and none of them had adequate knowledge and there is a need to improve the knowledge on Candida and Aspergischia White (fungal infection) and create awareness by conducting health education Programmes.

Acknowledgement

Authors would like to appreciate all the study participants for their cooperation to complete the study successfully.

Conflicts of interest: Authors declare no conflicts of interest.

Financial support and sponsorship: None

References

1. Li X, Xu S, Yu M, Wang K, Tao Y, Zhou Y *et al.* Risk factors for severity and mortality in adult COVID-19 inpatients in Wuhan. Journal of Allergy and Clinical Immunology 2020;146(1):110-118.
2. Zheng Z, Peng F, Xu B, Zhao J, Liu H, Peng J *et al.* Risk factors of critical & mortal COVID-19 cases: A systematic literature review and meta-analysis. Journal of infection 2020;81(2):e16-e25.
3. Hughes S, Troise O, Donaldson H, Mughal N, Moore LS. Bacterial and fungal coinfection among hospitalized patients with COVID-19: a retrospective cohort study in a UK secondary-care setting. Clinical Microbiology and Infection 2020;26(10):1395-1399.
4. Zhu X, Ge Y, Wu T, Zhao K, Chen Y, Wu B *et al.* Co-infection with respiratory pathogens among COVID-2019 cases. Virus Research 2020;285:198005.
5. Schauwvlieghe AF, Rijnders BJ, Philips N, Verwijs R, Vanderbeke L, Van Tienen C *et al.* Invasive aspergillosis in patients admitted to the intensive care unit with severe influenza: a retrospective cohort study. The Lancet Respiratory Medicine 2018;6(10):782-792.
6. Lamoth F, Calandra T. Let's add invasive aspergillosis to the list of influenza complications. The Lancet Respiratory Medicine 2018;6(10):733-735.
7. Huang J, Li H, Lan C, Zou S, Zhang H, Wang X *et al.* Concomitant severe influenza and cryptococcal infections: A case report and literature review. Medicine 2019, 98(19).
8. Wu W, Wang A, Liu M. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395(10223):497-506.
9. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. The lancet 2020;395(10223):507-513.
10. Cox MJ, Loman N, Bogaert D, O'Grady J. Co-infections: potentially lethal and unexplored in COVID-19. The Lancet Microbe 2020;1(1):e11.
11. Kosmidis C, Denning DW. The clinical spectrum of pulmonary aspergillosis. Thorax 2015;70(3):270-277.
12. Jenks JD, Hoenigl M. Treatment of aspergillosis. Journal of Fungi 2018;4(3):98.
13. Brown GD, Denning DW, Levitz SM. Tackling human fungal infections 2012.
14. Wang J, Yang Q, Zhang P, Sheng J, Zhou J, Qu T. Clinical characteristics of invasive pulmonary aspergillosis in patients with COVID-19 in Zhejiang, China: a retrospective case series. Critical Care 2020;24:1-4.
15. Du Y, Tu L, Zhu P, Mu M, Wang R, Yang P *et al.* Clinical features of 85 fatal cases of COVID-19 from

Wuhan. A retrospective observational study. American journal of respiratory and critical care medicine 2020;201(11):1372-1379.
16. Yang X, Yu Y, Xu J, Shu H, Liu H, Wu Y *et al.* Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. The Lancet Respiratory Medicine 2020;8(5):475-481.
17. Arastehfar A, Carvalho A, Van de Veerdonk FL, Jenks JD, Koehler P, Krause R *et al.* COVID-19 associated pulmonary aspergillosis (CAPA)—from immunology to treatment. Journal of Fungi 2020;6(2):91.
18. Alanio A, Dellière S, Fodil S, Bretagne S, Mégarbane B. Prevalence of putative invasive pulmonary aspergillosis in critically ill patients with COVID-19. The Lancet Respiratory Medicine 2020;8(6):e48-e49.
19. Mitaka H, Kuno T, Takagi H, Patrawalla P. Incidence and mortality of COVID-19-associated pulmonary aspergillosis: A systematic review and meta-analysis. Mycoses 2021.
20. Blaize M, Mayaux J, Nabet C, Lampros A, Marcelin AG, Thellier M *et al.* Fatal invasive aspergillosis and coronavirus disease in an immunocompetent patient. Emerging infectious diseases 2020;26(7):1636.
21. Meijer EF, Dofferhoff AS, Hoiting O, Buil JB, Meis JF. Azole-resistant COVID-19-associated pulmonary aspergillosis in an immunocompetent host: a case report. Journal of Fungi 2020;6(2):79.
22. Prattes J, Valentin T, Hoenigl M, Talakic E, Reisinger AC, Eller P. Invasive pulmonary aspergillosis complicating COVID-19 in the ICU-A case report. Medical mycology case reports 2021;31:2-5.
23. Lescure FX, Bouadma L, Nguyen D, Parisey M, Wicky PH, Behillil S *et al.* Clinical and virological data of the first cases of COVID-19 in Europe: a case series. The Lancet Infectious Diseases 2020;20(6):697-706.
24. Van Arkel AL, Rijpstra TA, Belderbos HN, Van Wijngaarden P, Verweij PE, Bentvelsen RG. COVID-19–associated pulmonary aspergillosis. American journal of respiratory and critical care medicine 2020;202(1):132-135.
25. Antinori S, Rech R, Galimberti L, Castelli A, Angeli E, Fossali T *et al.* Invasive pulmonary aspergillosis complicating SARS-CoV-2 pneumonia: A diagnostic challenge. Travel medicine and infectious disease 2020;38:101752.
26. Lahmer T, Rasch S, Spinner C, Geisler F, Schmid RM, Huber W. Invasive pulmonary aspergillosis in severe coronavirus disease 2019 pneumonia. Clinical Microbiology and Infection 2020;26(10):1428.
27. Santana MF, Pivoto G, Alexandre MAA, Baía-da-Silva DC, Borba MGDS, Val FA *et al.* Confirmed Invasive Pulmonary Aspergillosis and COVID-19: the value of postmortem findings to support antemortem management. *Revista da Sociedade Brasileira de* Medicina Tropical 2020, 53.
28. Nasir N, Farooqi J, Mahmood SF, Jabeen K. COVID-19-associated pulmonary aspergillosis (CAPA) in patients admitted with severe COVID-19 pneumonia: An observational study from Pakistan. Mycoses 2020;63(8):766-770.
29. Arastehfar A, Carvalho A, Van de Veerdonk FL, Jenks JD, Koehler P, Krause R *et al.* COVID-19 associated pulmonary aspergillosis (CAPA)—from immunology to treatment. Journal of Fungi 2020;6(2):91.
30. Ullmann AJ, Aguado JM, Arikan-Akdagli S, Denning DW, Groll AH, Lagrou K *et al.* Diagnosis and management of Aspergillus diseases: executive summary of the 2017 ESCMID-ECMM-ERS guideline. Clinical Microbiology and Infection 2018;24:e1-e38.
31. Pappas PG, Lionakis MS, Arendrup MC, Ostrosky-Zeichner L, Kullberg BJ. Invasive candidiasis. Nature Reviews Disease Primers 2018;4(1):1-20.
32. Agrifoglio A, Cachafeiro L, Figueira JC, Añón JM, García de Lorenzo A. COVID-19 and fungal co-infections: We must keep them in mind. Journal de mycologiemedicale 2020, 101012-101012.
33. Seitz T, Hoepler W, Weseslindtner L, Aberle JH, Aberle SW, Puchhammer-Stoeckl E *et al.* Successful management of the first reported case in Austria of COVID-19 with ARDS. Infection 2020;48(4):647-651.
34. Nori P, Szymczak W, Puius Y, Sharma A, Cowman K, Gialanella P *et al.* Emerging co-pathogens: New Delhi Metallo-beta-lactamase producing Enterobacterales infections in New York City COVID-19 patients. International Journal of Antimicrobial Agents 2020;56(6):106179.
35. Vila T, Sultan AS, Montelongo-Jauregui D, Jabra-Rizk MA. Oral candidiasis: a disease of opportunity. Journal of Fungi 2020;6(1):15.
36. Intra J, Sarto C, Beck E, Tiberti N, Leoni V, Brambilla P. Bacterial and fungal colonization of the respiratory tract in COVID-19 patients should not be neglected. American journal of infection control 2020;48(9):1130-1131.
37. Salehi M, Ahmadikia K, Mahmoudi S, Kalantari S, Jamalimoghadamsiahkali S, Izadi A *et al.* Oropharyngeal candidiasis in hospitalized COVID-19 patients from Iran: Species identification and antifungal susceptibility pattern. Mycoses 2020;63(8):771-778.