
<sup>1</sup> Institute of Oral Biology, National Yang Ming Chiao Tung University, Taipei, Taiwan

<sup>2</sup> Department of Dentistry, National Yang Ming Chiao Tung University, Taipei, Taiwan

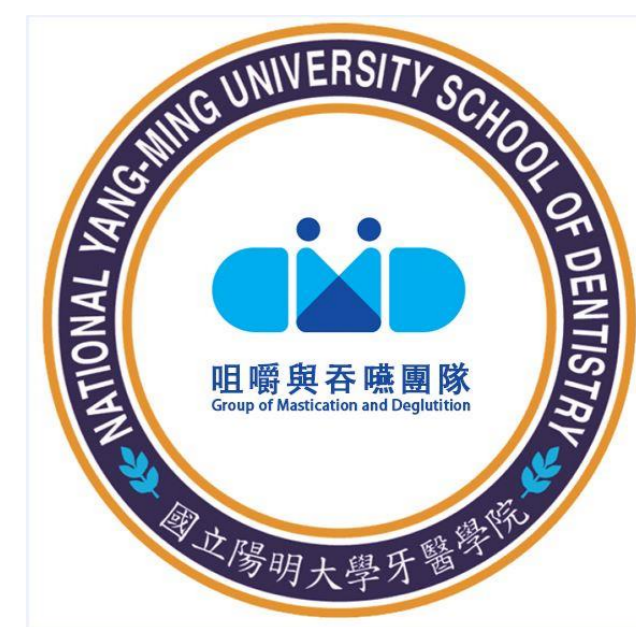
<sup>3</sup> Department of Stomatology, Oral & Maxillofacial Surgery, Taipei Veterans General Hospital, Taipei, Taiwan

<sup>4</sup> Department of Dentistry, National Yang Ming Chiao Tung University Hospital, Yilan, Taiwan

<sup>5</sup> Department of Biological Science and Technology, National Yang Ming Chiao Tung University, Hsinchu, Taiwan

<sup>6</sup> Far Eastern Memorial Hospital, New Taipei City, Taiwan

\*Authors contributing equally to this article.



## Introduction

Oral dysbiosis is the cause of many diseases related to oral and general health. However, few Asia-based studies have evaluated the role of oral microbiota specifically in patients receiving long-term care. As the understanding of oral microbiota in long-term care patients is insufficient, there is a need to inform new criteria and indications for early prevention and risk management based on information derived from the oral microbiota.

## Methods

We used next-generation sequencing (NGS) to identify the oral bacterial composition and abundance in 40 patients receiving long-term care: 20 from the dental outpatient department (OPD) of special needs and 20 community-dwelling, home-care patients. Their basic clinical-demographic information was obtained, and NGS was used to characterize the microbiota composition in each patient's tongue plaque sample. We then analyzed various alpha and beta diversity indices to assess within-group and between-group diversity.

## Result

The study flowchart (Figure 1) and patients characteristics and the result of oral examination (Table 1) were presented. Specifically, species diversity and homogeneity was higher in the OPD group than in the home-care group (Figure 2), suggesting that bacterial species were more balanced and stable in the OPD group than in the home-care group. Taxonomic analysis showed that the five most abundant phyla of the two groups (Figure 3). Further, within-group comparisons revealed that the microbiota of home-care patients were more divergent than that of OPD patients (Figure 4). The two groups showed significantly different bacterial diversity and homogeneity, as well as distinct dominant bacterial species (Figure 5). These findings indicated that home-care patients have a higher risk of oral or general disease due to the existence of specific dominant species as well as a less stable microbial community.

## Conclusion

Despite the limitation of scale in this study, we conclude that a significant difference exists in the oral microbiota between long-term care patients receiving treatment at OPD and those receiving home-care. The oral microbiota of home-care patients was less diverse than that of OPD patients, and specific pathogenic species were dominant, leading to dysbiosis.

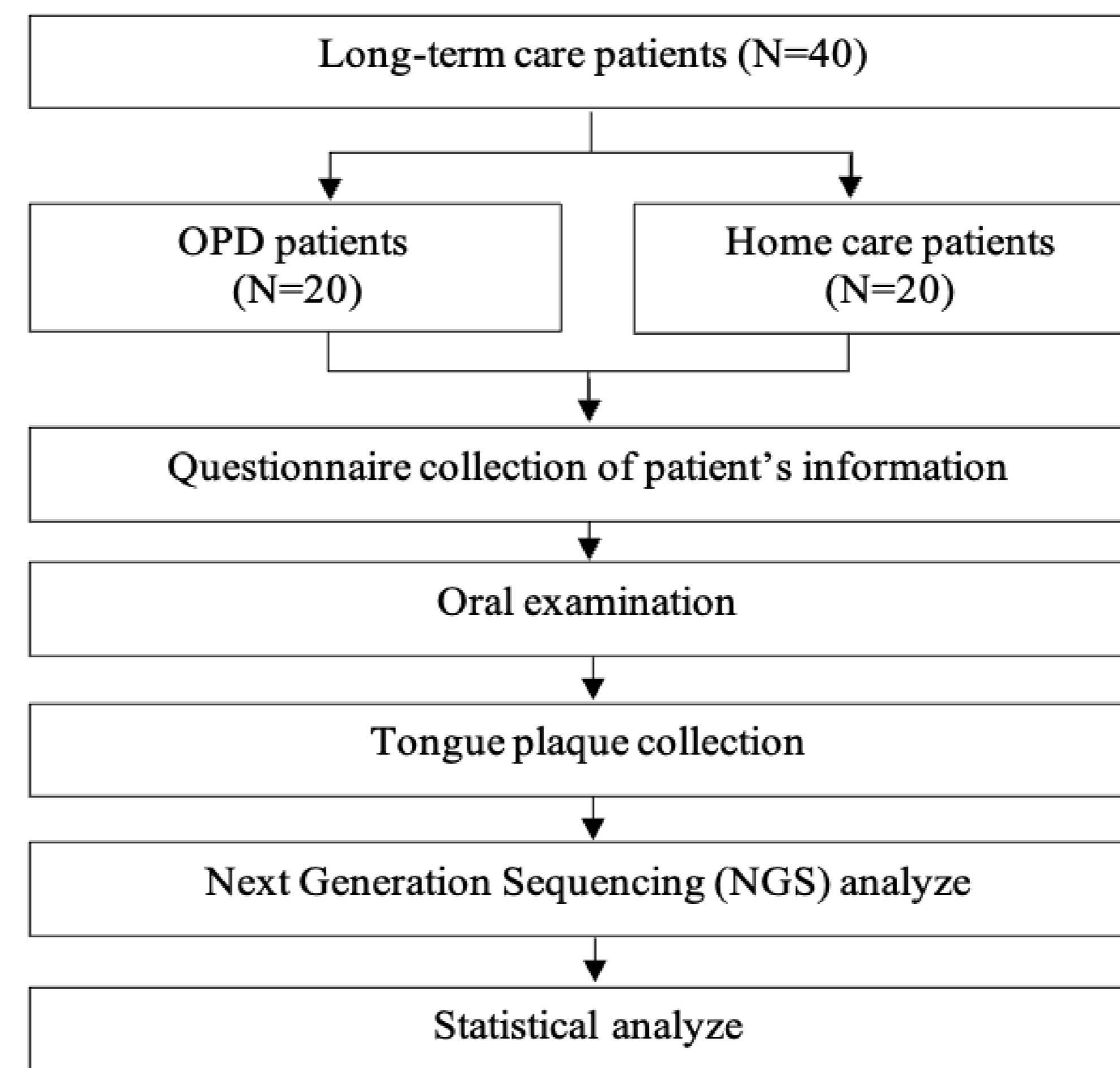


Figure 1. Flowchart of the study.

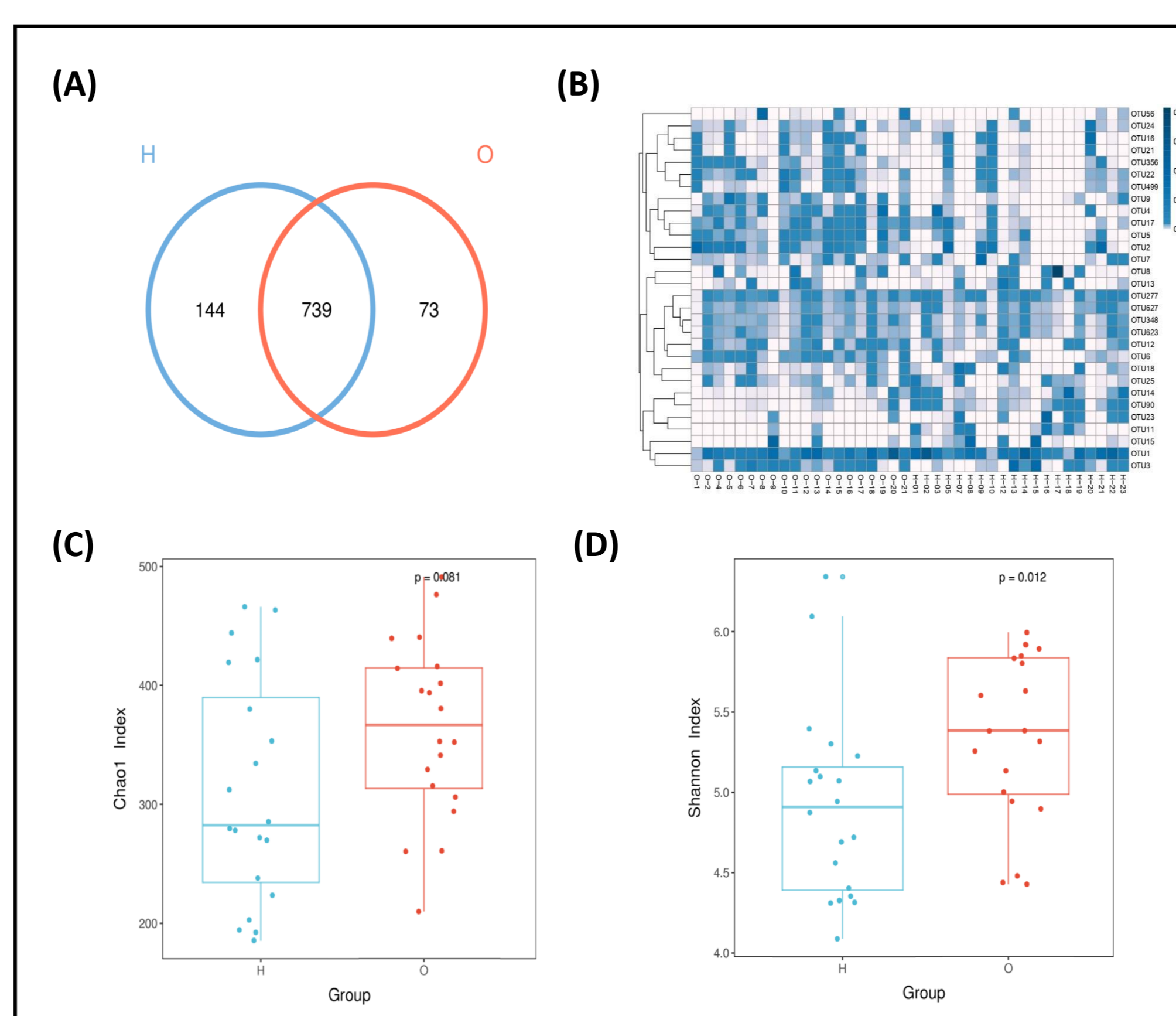


Figure 2. Comparison of microbiota composition between OPD and home care groups. (A) Venn diagram of the two groups. (B) OTU heat map. (C) The Chao1 index (D) The Shannon index. O, OPD group; H, home care group.

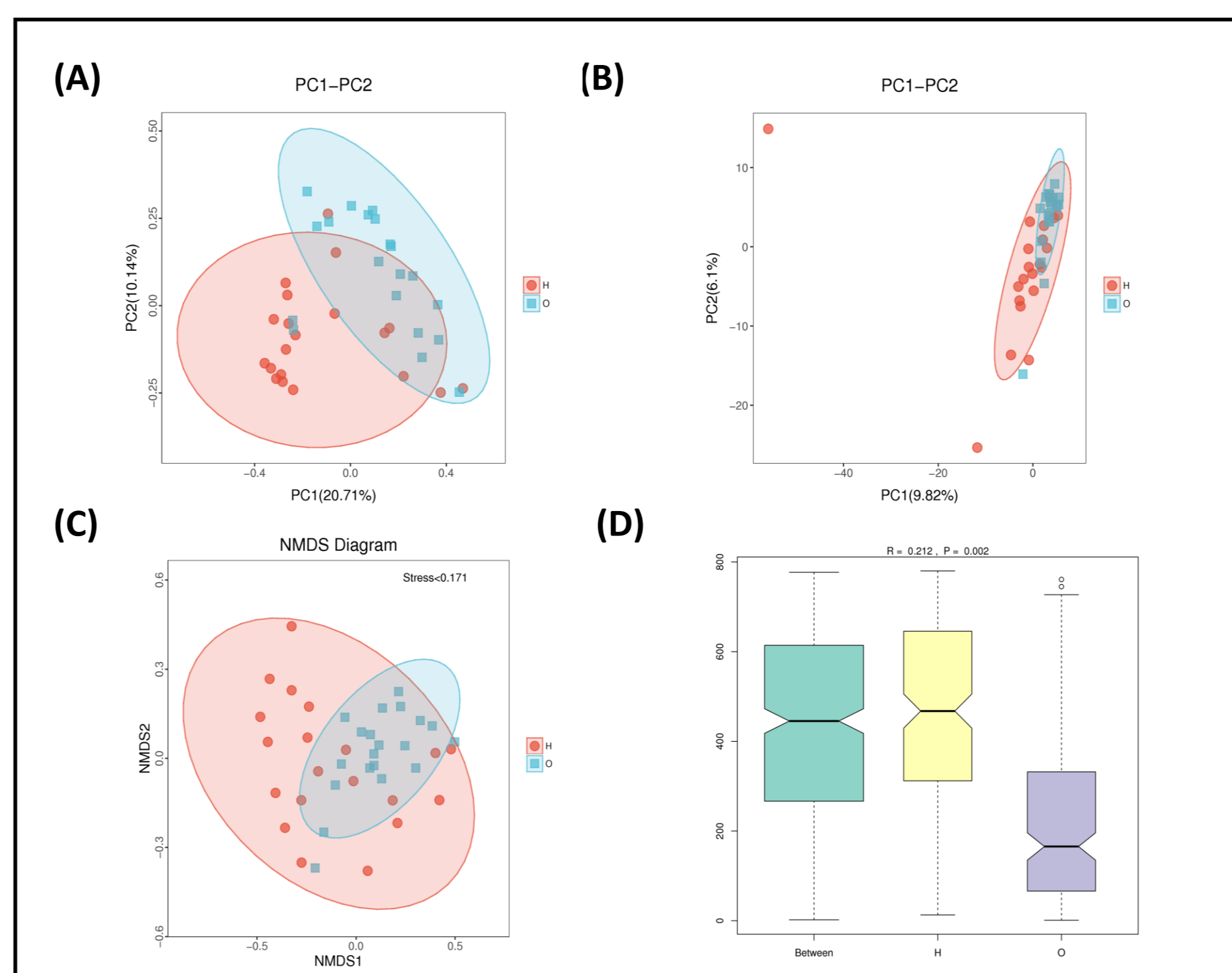


Figure 4. Comparison of the differences in microbiota composition between OPD and home care groups. (A) Principal coordinates analysis (PCoA) (B) principal components analysis (PCA) (C) Non-metric multidimensional scaling (NMDS) (D) analysis of similarities (ANOSIM). O, OPD group; H, home care group.

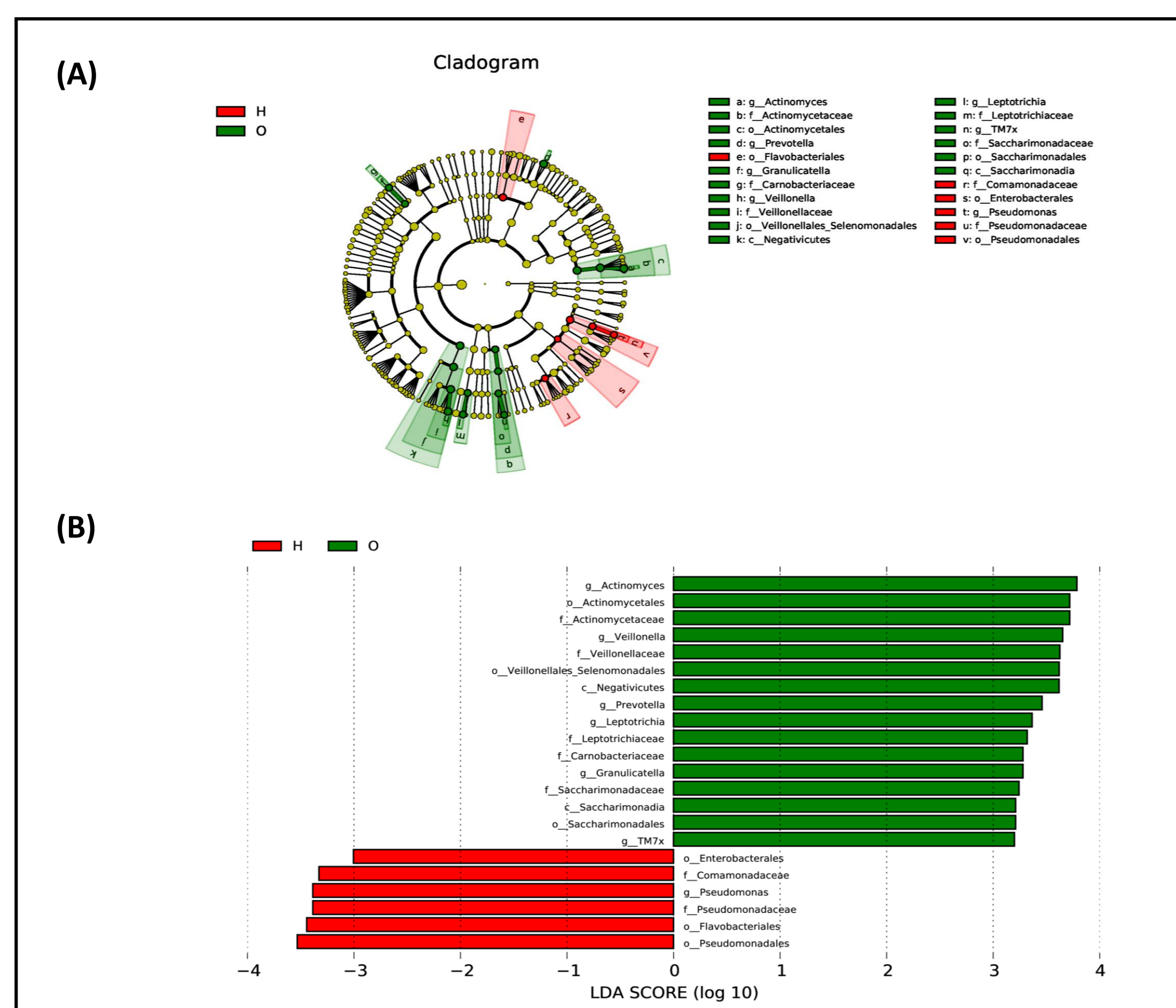


Figure 5. Comparison of the difference bacteria biomarker between OPD group and home care group. (A) LefSe analysis. (B) The LDA score. O, OPD group; H, home care group.

	OPD	Home care
Number of patients	20	20
Male/Female	10/10	8/12
Age in years mean (SD)	61.15 (15)	71.65 (25.7)
Disability level		
Moderate	7	0
Severe	8	10
Profound	5	10
Diseases		
Hypertension	8	10
Diabetes mellitus	6	5
Cardiovascular disease	5	10
Dementia	2	9
Liver disease	3	3
Kidney disease	3	6
Pneumonia history		
Yes	2	11
No	18	9
Nasogastric tube		
Yes	3	13
No	17	7
Bedridden		
Yes	2	19
No	18	1
Caries experience		
Decay	6	2
Missing	3	7
Residual root		
Yes	5	11
No	15	9
Periodontal Status		
Gingivitis	8	0
Periodontitis	8	20
Calculus		
Mild	2	0
Moderate	0	1
Severe	5	16
Moveable denture		
Partial	2	0
Full mouth	3	0
Crown / Bridge	3	10

Table 1. Demographic characteristics and oral examination of OPD patients (n=20) and home care (n=20).

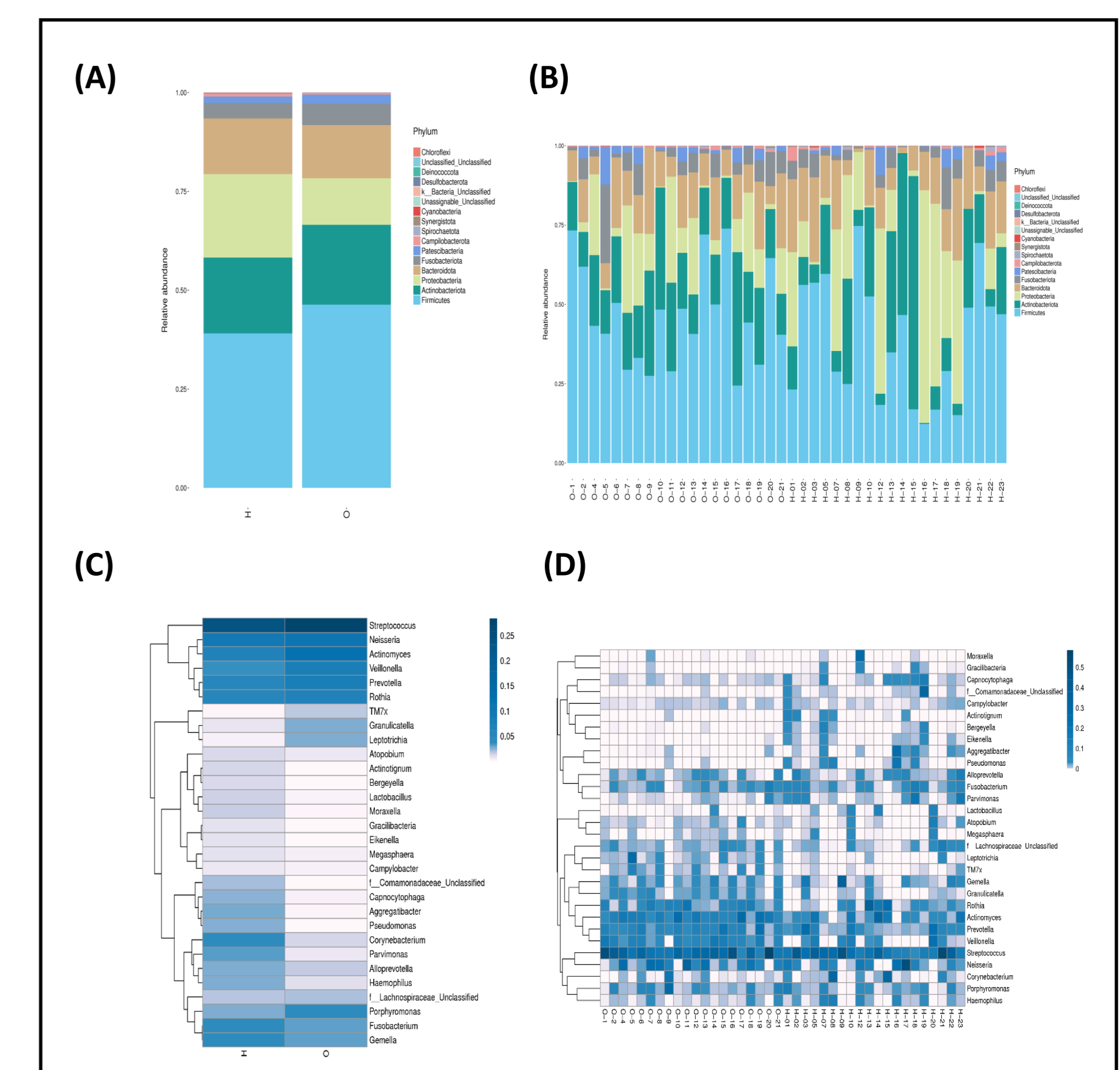


Figure 3. Comparison of the distinct bacterial taxa between the two groups. (A) Species annotation (B) The species distribution heat map. O, OPD group; H, home care group.