COPYRIGHT© INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

WAYFINDING FOR ALL: CASE STUDY MALAYSIAN PUBLIC HEALTH CLINIC

BY

TAHIRAH ZAHIRAH BINTI AZMAN

A thesis submitted in fulfilment of the requirement for the degree of Master of Science (Built Environment)

Kulliyyah of Architecture and Environmental Design
International Islamic University Malaysia

APRIL 2019

ABSTRACT

Wayfinding system plays a very crucial part in a complex design environment. This is especially evident in the environment of healthcare sector where various medical departments are located. The various types of users such as patients, visitors, and staff that visit the healthcare sector also need to be considered where they will be consist of people with disabilities and elderly that needs special elements in wayfinding system that help them navigate through the complex environment. This research aim to develop and recommends best practice for wayfinding for all as a set of tools for design practice in a public primary health clinic. The research methods and strategy that are applied are content analysis and case studies that will consist of evaluation through observation, access audit questionnaires and interview. Objectives of this research are (i) to assess the level of accessibility of existing facilities for PwDs and elderly as well as to identify levels of wayfinding in existing primary healthcare environment, (ii) to identify the relationship between levels of accessibility, level of wayfinding and wayfinding performance, and finally (iii) to identify different elements of wayfinding and to suggest wayfinding guidelines for all as a set of tool for design practice in primary health care environment. Firstly, through a rigorous literature review on wayfinding and wayfinding for PwDs, wayfinding design aspects for PwDs were identified. Secondly, based on existing knowledge of wayfinding and healthcare environment, wayfinding design parameters that are related to enabling wayfinding environment to PwDs will be developed. Thirdly, four evaluation tools; Universal Design Environment Assessment (UDEA), Wayfinding Environment Assessment (WEA), Wayfinding Design Parameter Rating Scale (WPRS), and Wayfinding Performance Assessment (WPA) are applied. Fourthly, previously identified wayfinding design parameters are further evaluated using Wayfinding Design Parameter Rating Scale (WDRS) by the users for their relevance. Finally, based on the findings, wayfinding guidelines for all, as a set of tools for design practice are developed to aid the architects and designer. Then study of the performance of the user using Wayfinding Performance Assessment (WPA) in relation to Universal Design Environment Assessment (UDEA), and Wayfinding Environment Assessment (WEA) are studied in each case study. The sample sizes collected for WPRS and WPA is 58 and 143 respondents respectively. The research led to the new findings on the existing situation of wayfinding in the Malaysian public health clinic, its improvement and effective wayfinding that fit for all. The case studies that are studied in this research are Klinik Kesihatan Presint 9 and Klinik Kesihatan Presint 18. Limitations of the research are limited time, finance, and human resources for research as well as research in the scope of Malaysian public health clinic. This research offer relevant information to wayfinding for all that can lead to improved user satisfaction, safety and user flow in Malaysian public health clinic. The suggested wayfinding design model has practical implications for architects and designers and offer some suggestions and possible solution, which act as tools for site design and building design of an inclusive primary healthcare environment.

خلاصة البحث

نظام Wayfinding يلعب دورا حاسما جدا في بيئة تصميم معقدة. هذا واضح بشكل خاص في بيئة قطاع الرعاية الصحية حيث توجد أقسام طبية مختلفة. يجب أيضًا مراعاة الأنواع المختلفة من المستخدمين مثل المرضى والزائرين والموظفين الذين يزورون قطاع الرعاية الصحية حيث سيتكونون من أشخاص ذوي إعاقات وكبار السن الذين يحتاجون إلى عناصر خاصة في نظام تحديد المسار الذي يساعدهم على التنقل عبر البيئة المعقدة. يهدف هذا البحث إلى تطوير ويوصي بأفضل الممارسات لإيجاد طرق جديدة للجميع كمجموعة من الأدوات لممارسة التصميم في عيادة صحية أولية عامة. كانت أساليب البحث والاستراتيجية التي يتم تطبيقها هي تحليل المحتوى ودراسات الحالة التي ستتألف من التقييم من خلال المراقبة، واستبيانات تدقيق الوصول والمقابلة. تكون أهداف هذا البحث كالآتي (1): تقييم مستوى الوصول إلى المرافق القائمة للأشخاص ذوي الإعاقة والمسنين وكذلك لتحديد مستويات التسيير في بيئة الرعاية الصحية الأولية القائمة، (2) تحديد العلاقة بين مستويات إمكانية الوصول ومستوى التوجيه. (3) وأخيراً، تحديد تحديد عناصر مختلفة لإيجاد الطريق واقتراح إرشادات توجيهية شاملة للجميع كمجموعة من الأدوات لممارسة التصميم في بيئة الرعاية الصحية الأولية. أولا، من خلال مراجعة أدبية صارمة حول تحديد طرق وإيجاد طرق ل PwDs ، تم تحديد جوانب تصميم لجودة .PwDsوثانياً، استناداً إلى المعرفة القائمة لسبل البحث عن البيئة وبيئة الرعاية الصحية، سيتم تطوير بارامترات تصميم مسار التوجيه ذات الصلة بتهيئة بيئة التسيير السريع للأشخاص ذوي الإعاقة. ثالثًا، أربع أدوات تقييم؛ يتم تطبيق تقييم بيئة التصميم العالمي (UDEA)، تقييم بيئة تحديد المواقع (WEA)، مقياس تقييم معلمات تصميم Wayfinding (WPRS) ، وتقييم أداء Wayfinding (WPA). رابعاً، يتم تقييم معلمات تصميم مسارات التعرف المحددة مسبقاً باستخدام مقياس تقييم معاملات تصميم Wayfinding (WDRS) من قبل المستخدمين لملاءمتها. وأخيرًا، وبناءًا على النتائج، تم تطوير إرشادات التوجيه الخاصة بالجميع، كمجموعة من الأدوات لممارسة التصميم لمساعدة المعماريين والمصمم. ثم يتم دراسة دراسة أداء المستخدم باستخدام تقييم أداء Wayfinding (WPA) فيما يتعلق بالتقييم العالمي للبيئة التصميم (UDEA)، والتقييم البيئي ل Wayfinding (WEA) في كل دراسة حالة. إن أحجام العينات التي تم جمعها ل WPRS و WPA هي 58 و 143 مستجيبًا على التوالي. وأفضى البحث إلى النتائج الجديدة حول الوضع الحالي لاستئصال المرض في عيادة الصحة العامة الماليزية، وتحسينه وفعاليته الفعالة التي تناسب الجميع. كانت دراسات الحالة التي تمت دراستها في هذا البحث هي Klinik Kesihatan Presint 9 و Klinik Kesihatan Presint 18. إن قيود البحث هي وقت محدود، وموارد مالية، وموارد بشرية للبحث بالإضافة إلى الأبحاث في نطاق عيادة الصحة العامة الماليزية. يقدم هذا البحث معلومات ذات صلة إلى كل ما يمكن أن يؤدي إلى تحسين رضا المستخدمين وأمانهم وتدفقهم في عيادة الصحة العامة الماليزية. والنموذج المقترح لتصميم نظام Wayfinding له آثار عملية للمهندسين المعماريين والمصممين ويقدم بعض الاقتراحات والحلول الممكنة، والتي تعمل كأدوات لتصميم الموقع وتصميم بناء بيئة الرعاية الصحية الأولية الشاملة.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science (Built Environment).

……..
Asiah Abdul Rahim
Supervisor

……..
Nurul Hamiruddin Salleh
Co-Supervisor

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science (Built Environment).

……..
Norwina Mohd Nawawi
Internal Examiner

……..
Mohd Yusooff Abbas
External Examiner

This thesis was submitted to the Department of Architecture and is accepted as a fulfilment of the requirement for the degree of Master of Science (Built Environment).

……..
Srazali Aripin
Head, Department of Architecture

This thesis was submitted to the Kulliyyah of Architecture and Environmental Design and is accepted as a fulfilment of the requirement for the degree of Master of Science (Built Environment).

……..
Abdul Razak Sapian
Dean, Kulliyyah of Architecture and
Environmental Design

DECLARATION

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Tahirah Zahirah binti Azman

Signature ..... Date .....

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED RESEARCH

WAYFINDING FOR ALL: CASE STUDY MALAYSIAN PUBLIC HEALTH CLINIC

I declare that the copyright holders of this thesis are jointly owned by the student and IIUM.

Copyright © 2018 Tahirah Zahirah binti Azman and International Islamic University Malaysia. All rights reserved.

No part of this unpublished research may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written permission of the copyright holder except as provided below

1. Any material contained in or derived from this unpublished research may be used by others in their writing with due acknowledgement.

2. IIUM or its library will have the right to make and transmit copies (print or electronic) for institutional and academic purposes.

3. The IIUM library will have the right to make, store in a retrieved system and supply copies of this unpublished research if requested by other universities and research libraries.

By signing this form, I acknowledged that I have read and understand the IIUM Intellectual Property Right and Commercialization policy.

Affirmed by Tahirah Zahirah binti Azman

……..…….. ……..
Signature Date

ACKNOWLEDGEMENTS

In the name of Allah, Most Merciful and Most Beneficent

This thesis would not have been possible without the help and support of many people. Thank you for giving all the support and motivation especially my parents, family, lecturers, staff, and friends. Please allow me to dedicate my appreciation and acknowledgement of gratitude towards the following significant advisors and contributors.

First and foremost, my highest gratitude and appreciation go to my academic supervisors, Professor Dato' Sri Dr. Ar. Asiah Abdul Rahim who was had given so much invaluable assistance, encouragement, support and guidance. She kindly guides me in managing the research, offered invaluable advice on grammar, organization and the theme of the paper. She also always motivates me along the process of completing this research, and for that, I will be forever grateful.

Second, I would like to express my love and appreciation to my beloved parents and siblings for their understanding, help and endless love, from the start to the completion of the studies. Heartiest gratitude to my dear parents, Azman bin Talib and Naeimah binti Hassan for their invaluable support, and prayers. They had been my source of inspiration and strength. Thank you for your understanding, patience, sacrifice and unwavering belief in me during the process of completing this research.

Lastly, I also wish to express my appreciation to Medical Research and Ethics Committee, Kementerian Kesihatan Malaysia (KKM), staffs at Klinik Kesihatan Presint 9 and Klinik Kesihatan Presint 18 and many others who provide time and effort for this research.

TABLE OF CONTENTS

Abstract ii
Abstract in Arabic iii
Approval page iv
Declaration v
Acknowledgements vii
Table of contents viii
List of Tables xi
List of Figures xiii
Abbreviation List xx
Glossary xxi

CHAPTER ONE: INTRODUCTION 1
1.1 Introduction 1
1.2 Background of the Study 1
1.3 Statement of Problem 2
1.4 Research Aim 4
1.5 Research Objectives 4
1.6 Research Questions 4
1.7 Scope and Limitations 5
1.7.1 Duration of study 5
1.7.2 Scope 5
1.7.3 Authorities 6
1.8 Significance of Contribution 6
1.9 Research Structure 7
1.10 Summary 9

CHAPTER TWO: HEALTHCARE SYSTEM 10
2.1 Introduction 10
2.2 Healthcare in Malaysia 10
2.2.1 Development of Healthcare Sector in Malaysia 11
2.2.2 Overview on Healthcare Services in Malaysia 13
2.3 Summary 18

CHAPTER THREE: UNIVERSAL DESIGN AND WAYFINDING 19
3.1 Introduction 19
3.2 Understanding Universal Design 19
3.2.1 Action Plan for People with Disabilities in Malaysia 22
3.3 People With Disability and Elderly 24
3.3.1 Conditions of elderly 25
3.3.2 Malaysian Definition of people with disability 27
3.3.3 Category of people with disability 27
3.4 Universal Design in Islamic Perspective and Human Right 28
3.5 Understanding Wayfinding 30
3.6 Wayfinding in Healthcare Sector 35
3.7 Consideration for Effective Wayfinding 37

3.8 Architectural Wayfinding for Healthcare Environment 39
3.8.1 Layout and Path in Healthcare environment 39
3.8.2 Legibility of Layout 40
3.8.3 Legibility of Route 45
3.8.4 A landmark in Healthcare Clinic 47
3.8.5 Visual Consideration 50
3.9 Informational Wayfinding for Healthcare Environment 51
3.9.1 Orientation Aids 51
3.9.2 Signage 54
3.10 Technologies in Wayfinding 62
3.11 Wayfinding Management 65
3.12 Development of Wayfinding Design Parameter 65
3.12.1 Architectural Wayfinding 66
3.12.2 Informational Wayfinding 70
3.13 Methodologies to be Adopted in Healthcare Environment Research 74
3.14 Survey Design and Data Collection 75
3.15 Summary 82

CHAPTER FOUR: RESEARCH METHODOLOGY 84
4.1 Introduction 84
4.2 Methodology used in the research 84
4.2.1 Observation 84
4.2.2 Interview 84
4.2.3 Questionnaire 85
4.3 Procedure for Monitoring Compliance of Subjects 86
4.4 Selection of Subject 87
4.4.1 Process of Subject Selection 87
4.4.2 Number of Subjects to Be Enrolled Including Reason and Calculation for Sample Size 87
4.5 Confidentiality and Security of Source Documents and Study Data 88
4.6 Criteria of Case Studies 89
4.7 Instruments and Evaluation Tools 90
4.7.1 Universal Design Environment Assessment (UDEA) 93
4.7.2 Wayfinding Environment Assessment (WEA) 94
4.7.3 Wayfinding Design Parameter Rating Scale (WPRS) 95
4.7.4 Wayfinding Performance Assessment (WPA) 95
4.8 Data Collection Procedure 96
4.9 Study Outcome 97
4.10 Summary 98

CHAPTER FIVE: ANALYSIS AND FINDINGS 100
5.1 Introductions 100
5.2 Introduction of Case Studies 101
5.2.1 Case Study 1: Klinik Kesihatan Putrajaya Presint 9 101
5.2.2 Case Study 2: Klinik Kesihatan Putrajaya Presint 18 103
5.3 General Approach 105
5.4 Findings for Universal Design Environment Assessment (UDEA) 110
5.4.1 Case Study 1: Klinik Kesihatan Presint 9 111

5.4.2 Case Study 2: Klinik Kesihatan Presint 18 120
5.4.3 Conclusion on Findings of Universal Design Environment Assessment (UDEA)..... 129
5.5 Findings for Wayfinding Design Parameter Rating Scale (WPRS) 130
5.6 Findings for Wayfinding Environment Assessment (WEA) 133
5.6.1 Physical Environment Analysis of Klinik Kesihatan Presint 9..... 134
5.6.2 Informational Wayfinding of Klinik Kesihatan Presint 9 139
5.6.3 Physical Environment Analysis of Klinik Kesihatan Presint 18 145
5.6.4 Informational Wayfinding of Klinik Kesihatan Presint 18 149
5.6.5 WEA Comparison of KKP9, KKP18 and WPRS 154
5.6.6 Conclusion on Findings of Wayfinding Environment Assessment (WEA)..... 156
5.7 Findings for Wayfinding Performance Assessment (WPA)..... 159
5.8 Relationship Between the Analysis of UDEA, WEA, WPA and WPRS 161
5.9 Summary..... 163

CHAPTER SIX: DISCUSSION, CONCLUSION AND RECOMMENDATION 165
6.1 Introduction..... 165
6.2 Strengths and Limitation of the Research..... 165
6.3 Discussion..... 166
6.4 Development of Effective Wayfinding Framework for All in Healthcare Environment Design Model 168
6.4.1 Wayfinding Consideration for Site Design 170
6.4.2 Wayfinding Consideration for Building Design 179
6.5 Suggested Future studies and Recommendation 191

BIBLIOGRAPHY 192

APPENDICES 202
APPENDIX A: ETHICAL APPROVAL DOCUMENTS 202
APPENDIX B: UNIVERSAL DESIGN ENVIRONMENT ASSESSMENT CHECKLIST (UDEA)..... 206
APPENDIX C: WAYFINDING ENVIRONMENT ASSESSMENT CHECKLIST (WEA)..... 214
APPENDIX D: WAYFINDING PERFORMANCE ASSESSMENT (WPA) 218
APPENDIX E: UKURAN PRESTASI DALAM MENCARI ARAH LALUAN (WPA)..... 224
APPENDIX F: WAYFINDING DESIGN PARAMETER RATING ..... SCALE (WPRS) 228
APPENDIX G: SKALA PENILAIAN PARAMETER REKABENTUK ARAH LALUAN 'WAYFINDING' (WPRS) 233
APPENDIX H: PELAN TINDAKAN OKU 2016-2022 (TERAS STRATEGIK 1 DAN 4)..... 237

LIST OF TABLES

Table 2. 1	Source of Healthcare financing in Malaysia, percent	11
Table 3. 1	Summary of Action Plan for People with Disabilities 2016-2022	23
Table 3. 2	The Related Long Term Program of Malaysian Plan of Action for People with Disabilities 2016-2022 with the Research	24
Table 3. 3	List of technologies in wayfinding	64
Table 3. 4	Development of Wayfinding Design Parameter for Architectural Wayfinding in public health clinic	66
Table 3. 5	Development of Wayfinding Design Parameter for Informational Wayfinding in public health clinic	70
Table 4. 1	Table showing the evaluation tools used for each research objective	91
Table 5. 1	Colour coding showing level of accessibility in the case studies	108
Table 5. 2	Architectural wayfinding design parameter in public health clinic	108
Table 5. 3	Informational wayfinding design parameter public health clinic	109
Table 5. 4	Level of Accessibility for Four Categories of Disability in Klinik Kesihatan Presint 9	112
Table 5. 5	Level of Accessibility for Four Categories of Disability in Klinik Kesihatan Presint 18	121
Table 5. 6	Statistical representation of Wayfinding Design Parameter Rating Scale	130
Table 5. 7	List of wayfinding design parameter with high rating value (4.8-4.3) listed from highest value according to experts	133
Table 5. 8	Informational Wayfinding Analysis of Klinik Kesihatan Presint 9	139
Table 5. 9	Informational Wayfinding Analysis of Klinik Kesihatan Presint 18	149
Table 5. 10	Observation of WEA of both case studies listed according to highest to lowest of wayfinding design parameter	157
Table 5. 11	Degree of differences of both case study	158
Table 5. 12	Comparison of Universal Design Environmental Assessment (UDEA) between KKP9 and KKP18	161
Table 5. 13	Comparison between result of WEA, WPA and WPRS	161

Table 6. 1 Suggested Wayfinding Design Model for Site Design for Klinik Kesihatan 170

Table 6. 2 Suggested Wayfinding Design Model for Building Design in Primary Healthcare 179

LIST OF FIGURES

Figure 1. 1	Phase of Research	8
Figure 2. 1	The structural of government primary health care	12
Figure 2. 2	The development of primary care service in Malaysia	15
Figure 2. 3	Schematic Overview of Malaysian Healthcare system	17
Figure 3. 1	Development of Universal Design	20
Figure 3. 2	Picture show the combination of architectural wayfinding and informational wayfinding	33
Figure 3. 3	Example of spatial configuration and movement flow analysis using space syntax	34
Figure 3. 4	Picture showing easy to understand signs and legible physical setting.	38
Figure 3. 5	Diagram showing accessible path from public transport and parking to internal spaces	40
Figure 3. 6	Diagram showing the example of clear and simple space organization that helps increase legibility of layout	41
Figure 3. 7	The picture showing the example of consistency of door design, knob and signage helps in creating sense of calmness.	42
Figure 3. 8	Picture shown the atrium space that helps in making visual reference between floors	44
Figure 3. 9	Pictures showing different character and identity used in each zoning to help with wayfinding	45
Figure 3. 10	Picture showing edge used to define boundaries and indicate difference space	47
Figure 3. 11	Ceiling design used as landmark	48
Figure 3. 12	Aquarium used as landmark in the building	49
Figure 3. 13	Picture showing lighting used to illuminated staircase area as one of the important are for wayfinding	50
Figure 3. 14	Example of You-are-here Map	53
Figure 3. 15	Example of information desk	54

Figure 3. 16 Picture showing various types of signage used in healthcare environment to help wayfinding 55

Figure 3. 17 Picture showing one of the identification signage type showing the level of the building 56

Figure 3. 18 Example of directional signage 57

Figure 3. 19 Picture showing the one of regulatory signage in a building 58

Figure 3. 20 Example of wayfinding using pictogram 59

Figure 3. 21 Signage with good colour contrast between pictogram and background colour 60

Figure 3. 22 Example of signage with Braille and raised tactile 61

Figure 3. 23 Use of mobile app in wayfinding 64

Figure 3. 24 The diagram showing the research methods used in the research 75

Figure 3. 25 The survey design used in the research 77

Figure 3. 26 Types of data collected for research 79

Figure 4. 1 The diagram showing the summary of the evaluation tools used in the research. 90

Figure 4. 2 Diagram showing evaluation tools used to achieve the objective of the study 91

Figure 4. 3 The diagram show the methodology approach and process in the research 97

Figure 4. 4 Methodology summary 98

Figure 5. 1 Picture showing location of Klinik Kesihatan Presint 9 102

Figure 5. 2 Panoramic view of Klinik Kesihatan Putrajaya Presint 9 (KKP9) from the 102

Figure 5. 3 Side entrance of KKP9 view from rehabilitation entrance 103

Figure 5. 4 Site plan of Klinik Kesihatan Putrajaya Presint18 104

Figure 5. 5 Panoramic view of Klinik Kesihatan Putrajaya Presint18 from the main entrance 104

Figure 5. 6 Entrance gate of KKP 18 105

Figure 5. 7 Diagram showing the flow of layout and marked point of KKP9 106

Figure 5. 8 Diagram showing the flow of layout and marked point of KKP18 107

Figure 5. 9 Picture showing the entrance to Klinik Kesihatan Presint 9 111

Figure 5. 10 Ground floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for wheelchair user 113

Figure 5. 11 Subbasement floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for wheelchair user 114

Figure 5. 12 Ground floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for visual impaired user 115

Figure 5. 13 Subbasement floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for visual impaired user 116

Figure 5. 14 Ground floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for hearing impaired user 117

Figure 5. 15 Subbasement floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for hearing impaired user 118

Figure 5. 16 Ground floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for crutches user 119

Figure 5. 17 Subbasement floor plan of Klinik Kesihatan Presint 9 showing simulation layout plan for crutches user 120

Figure 5. 18 Ground floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for wheelchair user 122

Figure 5. 19 First floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for wheelchair user 123

Figure 5. 20 Ground floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for visual impaired user 124

Figure 5. 21 First floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for visual impaired user 125

Figure 5. 22 Ground floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for hearing impaired user 126

Figure 5. 23 First floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for hearing impaired user 127

Figure 5. 24 Ground floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for crutches user 128

Figure 5. 25 First floor plan of Klinik Kesihatan Presint 18 showing simulation layout plan for crutches user 129

Figure 5. 26 Wayfinding Design Parameter Rating (WDRS) in 1-5 Scale from experts 132

Figure 5. 27 Zoning of Each Medical Department in Klinik Kesihatan Presint 9 (KKP9) 134

Figure 5. 28 Ground Floor Plan of Klinik Kesihatan Presint 9 135

Figure 5. 29 Sub-Basement Floor plan of Klinik Kesihatan Presint 9 136

Figure 5. 30 The ramp in the middle of the building allow visibility from the main corridor and waiting area. 137

Figure 5. 31 Open space and playground in the middle courtyard acts as marking or landmark for visitor. 137

Figure 5. 32 The use of pastel colour at feature wall of outpatient clinic helps create comfortable environment and part of wayfinding. 138

Figure 5. 33 KKP9 allow natural light into the building 138

Figure 5. 34 You-are-here map for KKP9 139

Figure 5. 35 The ticketing counter and information counter at KKP9 is located at a visible area and easy to identify by user 139

Figure 5. 36 Identification signage used at KKP9 140

Figure 5. 37 Directional signage provide at KKP9 140

Figure 5. 38 Regulatory signage at KKP9 141

Figure 5. 39 Hanging signage and environmental cues 142

Figure 5. 40 Type and size of font used at KKP9 142

Figure 5. 41 Colour combination use in signage at KKP9 143

Figure 5. 42 Pictogram and signage used at KKP9 144

Figure 5. 43 Maps used at KKP9 144

Figure 5. 44 Main entrance of KKP9 144

Figure 5. 45 Zoning of medical department in Klinik Kesihatan Presint 18 (KKP18) 145

Figure 5. 46 Ground Floor plan of Klinik Kesihatan Presint 18 146

Figure 5. 47 First Floor plan of Klinik Kesihatan Presint 18 147

Figure 5. 48 Middle courtyard of KKP18 acts as natural light source and visual interest 148

Figure 5. 49 Outpatient clinic use coloured feature wall as part of colour-coded zone in KKP18 148

Figure 5. 50 You-are-here map for KKP9 149

Figure 5. 51 The information counter at KKP18 149

Figure 5. 52 Identification signage used at KKP18 150

Figure 5. 53 Directional signage provide at KKP8 150

Figure 5. 54 Regulatory signage at KKP9 151

Figure 5. 55 Location of signage at KKP18 151

Figure 5. 56 Type and size of font used at KKP9 151

Figure 5. 57 Colour combination use in signage at KKP9 152

Figure 5. 58 Pictures showing the use of pictogram and colour in signage. 152

Figure 5. 59 Maps used at KKP18 153

Figure 5. 60 Main entrance of KKP9 153

Figure 5. 61 Wayfinding Environment Assessment for Case Studies in 1-5 Scale 155

Figure 5. 62 Wayfinding Performance Assessment for Case Studies in 0-2 Scale 160

Figure 6. 1 The diagram showing the wayfinding framework consist of wayfinding consideration for site and building design 169

Figure 6. 2 The loading off area at Klinik Kesihatan Presint 18 shown the clear indication of a service area 170

Figure 6. 3 Diagram showing the simple and straightforward circulation or path in the site design of Klinik Kesihatan Presint 18 171

Figure 6. 4 Picture shown the good practice of using consistent lighting 171

Figure 6. 5 Picture showing a wide concourse upon drop off indicate the main entrance of the building 172

Figure 6. 6 Waiting area for infection clinic located outdoor can be seen from the parking area 172

Figure 6. 7 Perpendicular path used in site design as good practices in the aspect of wayfinding 173

Figure 6. 8 Diagram showing good practice in providing accessible path in site design 173

Figure 6. 9 Green area and trees used to mark the boundary between road for cars, bicycle and pedestrian. 174

Figure 6. 10 Colourful tall column acts as landmark of the building 174

Figure 6. 11 Klinik Kesihatan Presint 9 used simple pattern and pastel colour in site design 175

Figure 6. 12 Lighting used to highlight the different level. 175

Figure 6. 13 External You are here map next to the building entrance 176

Figure 6. 14 Regulatory signage at parking area 177

Figure 6. 15 Diagram showing the location of signage near the main entrance, unobstructed and placed at eye level visible for all 177

Figure 6. 16 Example of signage with contrasting background colour 177

Figure 6. 17 Use of colour as wayfinding 178

Figure 6. 18 Example of external informational map 178

Figure 6. 19 Example of signage showing clear entrance sign 178

Figure 6. 20 Example of a simple and straightforward layout 179

Figure 6. 21 Example of asymmetrical layout plan 180

Figure 6. 22 Picture showing the consistency in the door design 180

Figure 6. 23 Diagram showing the example use of different pattern and colour in to identify zoning 181

Figure 6. 24 Diagram showing use of perpendicular corridor in Klinik Kesihatan Presint 18 182

Figure 6. 25 Wide and well-lit accessible path in Klinik Kesihatan Presint 18 182

Figure 6. 26 Playground can be used as landmark in healthcare building 183

Figure 6. 27 Use of pastel colour in Klinik Kesihatan Presint 18 184

Figure 6. 28 Corridor at Klinik Kesihatan Presint 18 well-lit with natural light 184

Figure 6. 29 Position of YAH map at the corridor junction 185

Figure 6. 30 Information counter are located next to the building entrance 185

Figure 6. 31 Example of identification signage with Braille 186

Figure 6. 32 Directional signage located at major intersection 186

Figure 6. 33 Unobstructed view toward exit signage 187

Figure 6. 34 Signage located at appropriate height 187

Figure 6. 35 Example of font and size used for signage in KKP18 188

Figure 6. 36 Text colour contrast with background clour 188

Figure 6. 37 Use of pictogram in the identification signage 189

Figure 6. 38 Example of simple maps with pictogram 189

Figure 6. 39 Entrance signage to the medical department 190

ABBREVIATION LIST

HPV	Human papillomavirus
KKM	Kementerian Kesihatan Malaysia
KKP9	Klinik Kesihatan Presint 9
KKP18	Klinik Kesihatan Presint 18
PwDs	People with Disabilities
UDEA	Universal Design Environment Assessment
WEA	Wayfinding Environment Assessment
WHO	World Health Organization
WPA	Wayfinding Performance Assessment
WPRS	Wayfinding Design Parameter Rating Scale

GLOSSARY

Environment	An indoor or outdoor setting or condition that influenced how people feel, behave, or work
Institution	An organization, facility or establishment in which exists to serve a public purpose such as education or support for people who need help
Human papillomavirus	Human papillomavirus is the most common sexually transmitted infection
Primary care	Health care provided by a medical or health-care professional with whom a patient has initial contact with the health-care system and who may refer the patient to a specialist if necessary
Sector	Subdivision of a system

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

This chapter explain the background studies, problem statements, issues, research questions, research objectives, scope, limitations, significance of contribution, and structure of this research. This thesis consisting of six chapters. This chapter elaborates on the problem statement, research questions, objective, scope, limitation, and significance of the study.

1.2 BACKGROUND OF THE STUDY

This research deals and outlines the existing facilities for PwDs, level of wayfinding and wayfinding performance of PwDs and elderly in a primary health care environment. Author Anderson et al., (2006); Rooke, Tzortzopoulos, Koskela, & Rooke, (2009) said, designing wayfinding for complex and public spaces or building such as hospital would pose an immense challenge as it associated with designing for 'different levels of knowing' and 'different needs' of the user. The user group would include elderly and various people with disabilities such as wheelchair user, vision impaired, hearing impaired, speech impaired, autism and learning disability. Wayfinding systems need to be universally effective to all group of user. Wayfinding systems often neglect the needs of the disabled community. For example, most signage is install only to the eye level of able-bodied but disregards the eye level of a wheelchair person and children.

More detail wayfinding best practices need to be outlined. Most research is concentrating on wayfinding for the able-bodied, not much research being found

concentrating on wayfinding from the perspective of elderly and people with disabilities in a complex environment such as healthcare sector in Malaysia. The findings will support and add to the previous finding. This study will enrich the literature since the discussion on this issue is limited. Therefore, this study will identify elements of effective wayfinding, evaluate existing condition of wayfinding in a complex environment in Malaysia and provide a recommendation on improvement on existing wayfinding in a complex environment. The identification of the elements of effective wayfinding and suggestion made to improve the existing wayfinding in a complex environment will serve as data to form a framework for effective wayfinding for all as a product of this study.

1.3 STATEMENT OF PROBLEM

Much literature on the issues of facilities for PwDs and elderly in a healthcare environment can be identified. Several studies already focusing on the facilities for PwDs and elderly in a healthcare environment. Despite the extensive research on the facilities for PWDs and elderly in healthcare, not much-known research has been done in the Malaysian primary health care context. There is still unclear situation on the existing facilities for PwDs and elderly in primary health care environment in Malaysia.

Poor coordination and balance, epilepsy, poor attention span in autism may require the building to be made physically accessible (Khare& Mullick, 2008). Since user of primary health care consists of various types of users including PwDs and the aged, the study also study the relationship of existing facilities for PWDs with wayfinding level and wayfinding performance. There is an unclear level of

wayfinding for PwDs and the aged in the primary healthcare environment and its relationship with universal design and wayfinding performance.

Several literature such as J.Carpman, (1995); Rousek& Hallbeck, (2011); Lee& Kline, (2011); Rooke, (2012) supported that one of the factors that caused stress to visitors is wayfinding. Not only it causes stress to patients and visitors but several studies conducted in healthcare environment shows that it also cost money due to the time spent by the staff explaining wayfinding to visitors while the time can be put into running the healthcare efficiently and missed doctor's appointment due to navigation problem in the healthcare environment (C. Zimring, 1990). The study by J.Carpman, (1995) already identified the typical wayfinding problem associated with wayfinding in healthcare facilities, which is unfamiliar medical terminology which confuses the visitor, display more than one sign that says different name, and lack of identification sign. However, the study carried out by J.Carpman, (1995) was to all visitors and not specified to the elderly and people with disabilities. Author Rooke, (2012) stated that there is a need to identify and formulate better or more effective wayfinding in a complex environment.

According to Rahaman, (2014), Malaysian standard and policies serve to ensure access for people with disability. Many literature focuses wayfinding for normal people such as J.Carpman, (1995);Churchill, Dada, de Barros, & Wirasinghe, (2008); Hashim, Alkaabi, & Bharwani, (2014); Rooke, (2012) but little study have been done for the elderly and people with disabilities. According to Hashim et al., (2014), user comprehend sign in a various way, thus, signage needs to be tested on elderly and people with disabilities especially people with limited literacy. Author Lee, Seda, Sun, & Coskun, (2014) stated that age affects greatly incomprehension of pictorial sign used in their studies and further study is needed to understand the