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ORIGINAL ARTICLES

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ORIGINAL ARTICLE

Associations among the Nutritional Status and Mental/Physical Functions of Care-dependent Individuals Living in Residential Homes for the Elderly

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ABSTRACT

This study examined the nutritional status and mental/physical functions of care-dependent individuals living in residential homes for the elderly, focusing on malnutrition as a leading cause of the progression of care dependency, to clarify the associations among them. A status survey was conducted, involving 147 care-dependent individuals living in 3 residential homes with care services for the elderly in Tokyo and Kanagawa. When focusing on physical functions, the Alb level was higher among residents exhibiting higher total ADL20 scores; based on this, approaches to prevent decreases in the nutritional status may be essential for the maintenance of ADL independence. This tendency was particularly marked when examining scores from the following ADL20 subscales: <indoor walking>, <ascending/descending stairs>, and <outdoor walking>, as the Alb level was higher among those who were able to perform these activities more independently. Regarding cognitive functions, the Alb level was lower when the total CDR score and scores from the following subscales indicated higher severity: <memory>, <orientation>, <judgment>, <social adaptation>, <family situation>, and <care situation>. This highlights the necessity of continuous nutritional management as a preventive measure against dementia. This study is suggesting the necessity of performing nutritional management, such as maintaining and restoring a favorable nutritional status in residential homes for the elderly lead a healthy and mentally and physically independent life.

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I. Introduction

In Japan, residential homes with and without care services are currently available as private homes for the elderly. When using home care services based on the Long-term Care Insurance System, subsidies are allocated, corresponding to the category 'daily care for specific facility users'. In recent years, while delays in the construction of Long-term Care Insurance-covered facilities have been noted, the numbers of private (residential) homes for the elderly and their residents have steadily increased; the values, which were 276 and 30,792, respectively, in 2008, increased to 7,563 and 315,678, respectively, in 2013. On comparing the national mean Care Grade and that of insurance-covered facility users, the former is still lower, at 2.2, but grades 4 and 5 account for more than 25%, revealing the increasing demand of the elderly requiring care for such homes.

Residential homes for the elderly are regarded as new locations for the elderly to relocate from their long-lived-in homes (Toyama, 2014). Furthermore, it is expected that the homes will accommodate needs related to the comprehensive community-based care system as key to social insurance system reform to prepare for 2025, when all baby-boomers will be aged 75 or over. In such a situation, care approaches in these homes should be reviewed, covering the concept of 'private but unaccustomed homes, in addition to that of 'facilities'. Although some studies examined multi-professional collaboration in residential homes with care services for the elderly, involving their staff (Kakinuma, 2013), the actual situation of such homes with or without care services, including residents' conditions and the contents of care, has yet to be clarified. Furthermore, as the mean Care Grade on admission to residential homes for the elderly is lower than that in insurance-covered facilities, the length of residence in the former tends to be long, and a large number of the elderly chose to stay in such homes until the end of their lives. In line with this, care for residents showing steadily progressing age-related changes in their conditions, leading to the necessity of leading a daily life in the presence of multiple diseases occurring with time, or coping with cognitive impairment, is needed in these homes.

Malnutrition is regarded as a leading cause of the progression of care dependency. When the Long-Term Care Insurance Act was revised, nutritional management was added as a category of business activities to prevent care-dependency. According to an estimate based on the results of comprehensive evaluation of the outcomes of such activities (Tsuji, Ueda, Okubo et al., 2009) approximately 30% of elderly individuals with an increased risk of care-dependency require nutritional improvement.

To examine the nutritional status and mental/physical functions of care-dependent individuals living in residential homes with care services for the elderly, focusing on the former as a factor associated with care dependency and its progression, and to clarify the association between the former and latter.

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II. Methods

1. Study design

A quantitative, descriptive study (status survey)

2. Study period

November 2015 (30 days)

3. Subjects

Care-dependent individuals living in residential homes with care services for the elderly

4. Study items

1) Basic attributes : Sex , Age
2) Care grade
3) Nutritional status : dietary intake, albumin (Alb) level
4) Physical functions : Levels of ADL Independence of the Elderly with Disabilities (J : outdoor walking level , A : indoor walking level , B : wheelchair level , C : bed level , ADL20 (Activities of Daily Living 20)
5) Mental functions : Levels of ADL Independence of the Elderly with Dementia (Ⅰ: suspect level , Ⅱ: attention level , Ⅲ: sometimes care level , Ⅳ: all day care level , M : hospital level) , CDR (Clinical Dementia Rating , CDR0.5 : suspected dementia , CDR1 : mild dementia , CDR2 : moderate dementia , CDR3 : severe dementia)
6) Status of hospital visits

5. Data collection

A questionnaire survey was conducted, asking home staff to provide copies of data related to residents.

6. Data analysis

The associations among the nutritional status and mental/physical functions of care-dependent residents were analyzed using SPSS Ver.22.0 as statistical analysis software.

III. Ethical considerations

This study was conducted with the approval of the Ethics Committee of the Faculty of Health Care and Nursing, Juntendo University. Questionnaire responses were transcribed by home staff. In the process of transcription, the data were converted into IDs as a measure to prevent the identification of individuals.

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IV. Results

Data related to 147 care-dependent individuals living in 3 residential homes with care services for the elderly in Tokyo and Kanagawa. There were 28 (19.0%) males and 119 (81.0%) females, with a mean age of 88.7±5.5. Their mean Care Grade was 3.13±1.64. The mean dietary intakes were 1230.0±304.4kcal. The mean Alb levels were3.6±0.5g/dl. Ranks based on the Degrees of ADL Independence of the Elderly with Disabilities varied as follows: J: 6(4%), A: 74(50%), B: 51(35%), and C: 16(11%). The mean ADL20 score was 20.5±15.9/80, revealing their poor ADL independence. The results of the Degrees of ADL Independence of the Elderly with Dementia were as follows: I: 21(14%), IIa: 29(20%), IIb: 37(25%), IIIa: 21(14%),Ⅳ:16 (11%),M:4(3%). On assessment using the CDR, 24% of all cases were classified as mild (CDR-1) and severe (CDR-3) dementia, followed by suspected (CDR-0.5; 23%) and moderate (CDR-2; 20%) dementia; all severities of dementia were similarly observed (Table 1).

<Table 1> Basic Attributes of Care-dependent Elderly (n=147)

Sex	Males	28(19%)
	Females	119(81%)
Age		88.7±5.5
Care grade		3.13±1.64
Dietary intakes		1230.0±304.4kcal
Alb levels		3.6±0.5g/dl
Levels of ADL Independence of the Elderly with Disabilities	J	6(4%)
	A	74(50%)
	B	51(35%)
	C	16(11%)
ADL20 score		20.5±15.9/80
Levels of ADL Independence of the Elderly with Dementia	Ⅰ	21(14%)
	Ⅱa	29(20%)
	Ⅱb	37(25%)
	Ⅲa	21(14%)
	Ⅲb	19(13%)
	Ⅳ	16(11%)
	M	4(3%)
CDR	CDR-0.5	34(23%)
	CDR-1	35(24%)
	CDR-2	29(20%)
	CDR-3	34(23%)

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On correlation analysis, the Alb level, representing the nutritional status, showed a weak negative correlation with the age (-.226) as an attribute. Regarding physical functions, the Alb level also showed a weak negative correlation with the results of the Degrees of ADL Independence of the Elderly with Disabilities (-.223) , and a weak positive correlation with the total ADL20 score (.239) and scores from the following subscales: <indoor walking (.233) >, <ascending/descending stairs (.227) >, and <outdoor walking (.214) >. Regarding cognitive functions, the Alb level showed a weak negative correlation with the results of the Degrees of ADL Independence of the Elderly with Dementia (-.240) , in addition to the total CDR score (-.252) and scores from the following subscales: <memory (-.280) >, <orientation (-.209) >, <judgment (-.246) >, <social adaptation (-.245) >, <family situation (-.284) >, and <care situation (-.321) >. It showed a weak positive correlation with the status of hospital visits (.254) (Spearman's ρ). These results are shown in Table 2.

<Table 2> Correlations among the Alb Level and Mental/Physical Functions (n=147)

		Alb level
Attributes	Age	-.266**
Physical functions	Results of the Degrees of ADL Independence of the Elderly with Disabilities	-.223**
	ADL20 <indoor walking>	.233**
	ADL20 <ascending/descending stairs>	.227**
	ADL20 <outdoor walking>	.214**
	Total ADL20 score	.239**
Cognitive functions	Results of the Degrees of ADL Independence of the Elderly with Dementia	-.240**
	CDR <memory>	-.280**
	CDR <orientation>	-.209*
	CDR <judgment>	-.246**
	CDR <social adaptation>	-.245**
	CDR <family situation>	-.284**
	CDR <care situation>	-.321**
	Total CDR score	-.252**
Others	Status of hospital visits	.254**

* p < 0.05 ** p < 0.01 Spearman's ρ

Furthermore, to clarify factors influencing the Alb level, multiple regression analysis (stepwise method) was performed with the Alb level as a dependent variable and the items that showed a correlation on correlation analysis as independent variables. Among the CDR and ADL 20 items, <memory (-.216) > and <indoor walking (.177) >, respectively, were shown to influence the Alb level. The obtained regression equation was as follows:

The Alb level = -0.074 × CDR: <memory> + 0.066 × ADL20: <indoor walking> + 3.715

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<Table 3> Results of Multiple Regression Analysis of the Alb Level and Mental/Physical Functions (n=147)

	Standardizing coefficient
CDR: <memory>	-.216*
ADL20: <indoor walking>	.177*
R^2	.102
Adjusted R^2	.089
F-value	8.080**
df	2

* p < 0.05 ** p < 0.01 Stepwise method

V. Discussion

On analyzing the associations among the nutritional status and mental/physical functions of care-dependent individuals living in residential homes for the elderly, with the Alb level as an index for the former, the level was lower among older residents, indicating the necessity of continuous nutritional management for individuals living for a long period in residential homes for the elderly.

When focusing on physical functions, the Alb level was higher among residents exhibiting higher total ADL20 scores; based on this, approaches to prevent decreases in the nutritional status may be essential for the maintenance of ADL independence. This tendency was particularly marked when examining scores from the following ADL20 subscales: <indoor walking>, <ascending/descending stairs>, and <outdoor walking>, as the Alb level was higher among those who were able to perform these activities more independently. This is consistent with the results of the researchers' previous study, in which the mobility and walking ability were suggested to influence the Alb level (Fujio, Ogawa, Inoue et al., 2016).

Regarding cognitive functions, the Alb level was lower when the total CDR score and scores from the following subscales indicated higher severity: <memory>, <orientation>, <judgment>, <social adaptation>, <family situation>, and <care situation>. This highlights the necessity of continuous nutritional management as a preventive measure against dementia. Approaches for appropriate hydration, nutrition, activities, and bowel movements have also been shown to be important as a part of basic care for individuals with dementia; in a study, symptoms of dementia markedly improved through workshops for the families of patients with dementia, adopting such basic care approaches (Kodaira & Takeuchi, 2015).

It was also revealed that residents with lower Alb levels visited hospitals more regularly, indicating the presence of some disease.

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In the researchers' previous study, both medical and welfare service providers' awareness of care-dependent individuals' nutritional status was poor (Fujio & Kodaira, 2014), indicating the necessity of nutritional management may be indispensable.

Ⅵ. Conclusion

This study is suggesting the necessity of performing nutritional management, such as maintaining and restoring a favorable nutritional status in residential homes for the elderly lead a healthy and mentally and physically independent life.

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ORIGINAL ARTICLE

A Survey on International Nursing Education of National Universities in Japan

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ABSTRACT

Objective: In this study, we clarified the current status of international nursing education at the national university and investigated issues related to education in the future.
Method: Self-administered questionnaires were distributed by mail to the educators responsible for international nursing education (one per university) at 42 nursing departments of national universities. The survey period was from July 1st to September 30th 2016.
Results: Responses were received from all 20 universities with full-time educators. For the 22 universities without full-time educators, information was collected by phone, email, and from the homepage of their specific university. As a result, information was obtained for all 42 universities. Of these, 85.7% implemented international nursing education and 52.4% have established it as a compulsory subject. In all, there were 61.9% universities with full-time nurses acting as academic advisors. Most of educators considered that "understanding of different cultures," "world health policies," and "content relating to international cooperation" were essential contents for education in the future.
Discussion: As 52.4% of the universities that were surveyed treated international nursing as a compulsory subject, it is considered that whether or not one receives lectures on international nursing education is largely effected by the system of the university and the choice of the student. Regarding issues in the future, the construction of a curriculum aiming for the development of human resources with the capacity for practical application and rich in internationality is necessary.

＜Key-words＞
international health, education, national university, nursing, Japan

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I. Background

Following the globalization of nursing, the importance of thorough international nursing education has attracted a lot of attention. The report from the Improvement of Basic Nursing Education Review (Ministry of Health, Labour and Welfare, 2009), included the following guideline: "Cooperation with foreign countries as nurses should be considered from a broad perspective in international society." Moreover, the report from the Nursing Staff University Training Review (Ministry of Education, Culture, Sports, Science and Technology, 2011), clearly states that undergraduate programs for nursing staff training should "aim to train personnel rich in internationality with practical application ability in order to contribute to health care, medicine and welfare." In response to these governmental policies, universities began working towards providing international nursing education. However, it is currently difficult to allot enough time to international nursing education, because it is necessary to educate students in accordance with Specified Rules of Schools and Vocational Schools for Public Health Nurses, Midwives, and Registered Nurses (Ministry of Health, Labour and Welfare, 2017) as an addition to the educational content for undergraduate programs stipulated by the Ministry of Education, Culture, Sports, Science and Technology. Moreover, Nakagoshi, Mori, Tanaka, et al. (2014) noted that "it is still unclear what qualities should personnel rich in internationality possess and what goals should be attained by the time of graduation."

With this background, Convention of National Universities of Public Health and Nursing across Japan have joined the Convention of National Public Health Universities, and have been deliberating shared issues and important matters in the area of education with the objective of contributing to the development of the educational environment. As part of the discussion, the efforts made by national universities in the area of international nursing education were considered (Convention of National Public Health Universities, 2015), and it became clear that there are disparities between educational programs. However, it is not clear what exactly the educational programs implemented at the universities are and no prior studies on the subject can be found.

Thus, the current study focused on national universities that provide nursing education and described the current situation with respect to international nursing education while discussing issues requiring future attention.

We believe the findings of this study will become a fundamental contribution for further development of international nursing education in national universities providing nursing education.

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II. Research Methods

1. Study Design

The design was cross-sectional quantitative research using a self-administered questionnaire survey.

2. Survey Contents

1) The format of international nursing education classes
2) The work type of the head educators
3) The contents of international nursing education
   A) Information about the current education content was collected in a free writing section.
   B) Information about education content that will become necessary in the future (20 items): We created this items from previous research of international nursing (Nakagoshi, Mori, Tanaka, et al., 2014; Marui & Moriguchi, 2008; Minami, Shinkawa, Ohno, et al., 2013), based on the opinions of one international nursing faculty member and four international health and medical workers.

3. Survey Methods

1) Subjects

These included teaching staff responsible for international nursing education at nursing department of national universities in Japan.

2) Data Collection Method

An independently created self-administered questionnaire was distributed by mail. Of the 42 universities, responses were received from 20 universities with full-time teaching staff responsible for international nursing (response rate: 47.6%). For the 22 universities without full-time teaching staff for international nursing, enquiry information was collected by phone or email. Additionally, the syllabi officially published on the home page of each university were also referenced. As a result, information for question items—other than education content thought to be necessary in the future—was obtained from all 42 universities.

3) Survey Period

July 1st to September 30th 2016

4) Analytical Method

For the analysis, descriptive statistics using Excel 2010 were performed.

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4. Ethical Considerations

The present research was conducted after obtaining approval from the Ethics Committee of the Saga University Faculty of Medicine (Approval Number: 28-9).

To obtain the consent of participants, an explanation form with the following contents was enclosed along with the questionnaire form. Mailing of the questionnaire was considered consent.

- Study purpose.
- The subject has decided to cooperate with the survey of his/her own volition and the subject will not be disadvantaged even if they decline to participate.
- Study will be conducted anonymously and without individually identifying information.
- Results data will be used only for academic purposes.

III. Results

1. The Format of International Nursing Education Classes

A breakdown of credits and class time is shown in Table 1. There were 36 universities (85.7%) that established international nursing education as a lecture course and 6 universities (14.3%) for which it was not established. There were 22 universities (52.4%) that considered it a compulsory subject and 14 universities (33.3%) that considered it an elective subject. Regarding the education time, regardless of the established format of the class, universities that set a curriculum of 1 credit and 15 hours were the most common. Universities with less than 10 hours of education time integrated this course into another basic nursing subject.

＜Table 1＞ Credits and lecture hours for universities practicing international nursing education by course format (n = 36)

	Compulsory(n=22)		Elective(n=14)	
Credits and lecture hours	Universities	%	Universities	%
2 credits 30 hrs	2	5.6	1	2.8
1 credit 30 hrs	2	5.6	0	0
1 credit 15 hrs	10	27.7	12	33.3
1 credit 16.5 hrs	1	2.8	0	0
Other	7	19.4	1	2.8

※ Other: 2–10 course hours within another lecture course.

※ The number of hours per 1 credit was 15–30 hours and was determined at the discretion of each university.

2. Educators Teaching International Nursing

The qualifications and working patterns of the educators responsible for international nursing education are shown by class format in Table 2. There were 26 universities

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(61.9%) that included full-time nurses as educators responsible for international nursing education and 16 universities (38.1%) that only had full-time nurses. Universities with multiple educators responsible for international nursing education, aside from full-time nurses, included appointed doctors, public health nurses, midwives, laboratory technicians, and epidemiologists.

＜Table 2＞ Job type and work type of the educators responsible for international nursing education by the course format of the university (n=36)

Work Type	Job Type	Compulsory (22)		Elective (14)	
		Universities	%	Universities	%
Full Time	Nurse	9	25	7	19.3
	Doctor	2	5.6	0	0
	Non-Medical Staff	1	2.8	1	2.8
	Full-Time Nurse + Other Jobs*)	6	16.6	4	11.1
Part Time	Nurse	2	5.6	2	5.6
	Non-Medical Staff	2	5.6	0	0

*) Other Jobs: Doctor, Public Health Nurse, Midwife, Laboratory Technician, Epidemiologist

3. Educational Contents Necessary in International Nursing Education

Current educational contents are shown in Table 3. Out of 36 universities, 5 (13.8%) conducted education outside of classroom lectures. To summarize, there were two universities that had overseas training in Thailand, one university that had overseas training in South Korea, one university that had training at a hospital conducting international medical care activities, and one university that had training through international exchange within Japan. Further, regarding original educational content, content such as lectures by individuals who had experience as Japan Overseas Cooperation Volunteers or officials of the Japan International Cooperation Agency were seen.

<Table 3> Current international nursing course format in the 42 universities (n = 42)

	Compulsory (22)	Elective (14)	No Course(6)
Only classroom lecture	20	12	0
Classroom lecture & practical training	2	2	0
Only practical training	0	0	1
No international nursing course	0	0	5

With regard to educational content necessary in the future, responses were obtained from 17 universities, the details of which are shown in Table 4. Of the 20 items, 5 items with the most votes were “understanding of different cultures,” “world health policies,” “content relating to international cooperation,” “communication ability,” and “information pertaining to country’s health insurance policy and health care system.”

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<Table 4> International nursing education contents emphasized by university educators (n = 17)

		Number of Vote
1.	Understanding of different cultures (information pertaining to culture, customs, religion)	13
2.	About world health policies (policies, guidelines, etc., such as WHO)	11
3.	Content relating to international cooperation (JICA, NGO, etc.)	9
4.	Communication ability (languages used in that country)	8
5.	Information pertaining to that country's health insurance policy and health care system	7
6.	About that country's public health	6
7.	About that country's sanitation conditions, such as infectious disease	5
8.	About the health care of foreign residents in Japan	4
9.	That country's health care statistics	4
10.	About emergency aid activities (disaster nursing activities)	3
11.	Travel medicine (about medical knowledge, such as what vaccinations are necessary for travel)	2
12.	Information pertaining to that country's security status	2
13.	About that country's nursing education system	2
14.	Information pertaining to that country's infrastructure (infrastructure for daily life: roads, hospitals, etc.)	2
15.	About that country's maternal and child health	1
16.	Information pertaining to that country's political system	1
17.	About that country's community health care	1
18.	Knowledge pertaining to that country's nutrition	0
19.	Knowledge pertaining to that country's traditional medicine	0
20.	Other	4

IV. Discussion

1. The Format of International Nursing Education Classes

Within nursing department of national universities in Japan, 85.7% of universities carry out international nursing education, thus indicating that majority of universities are teaching this subject. However, 52.4% treated it as a compulsory subject, and regarding class time, a maximum difference of 28 hours was revealed. Accordingly, whether international nursing education is taken during one's undergraduate career is thought to be immensely influenced by the curriculum of the university and the choice of the student. With regard to universities that do not have an established course related to international nursing, there are universities that only implement international exchange or those that, while they feel the necessity for it in the future, have not yet launched such a program.

2. Educators Teaching International Nursing

Most of the educators responsible for international nursing education were nurses.

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Aside from these, various medical personnel with international medical care experience were appointed as educators who were responsible for international nursing education, and it was ascertained that international nursing was widely taught as international health care. In a report investigating the improvement of basic nursing education, implemented in 2009, information regarding educators "taking advantage of outside lecturers with experience in disaster nursing or international nursing, etc." and "the need for individuals who possess suitable clinical practice ability, the appointment of professors who can teach this type of content, and improvements in the quality of professors, etc. is necessary " were clearly noted (Ministry of Health, Labour and Welfare, 2009). In international nursing education, it is believed that clarification of the education objectives of each university and improvement of the quality of instructors is essential.

3. Educational Contents Necessary in International Nursing Education

Regarding the education contents, in the "integration and practice of nursing" sphere, established since 2007, learning in an environment similar to clinical practice is promoted; however, presently only a small number, 13.8%, of universities are conducting practical education outside of classroom lectures, such as training overseas or international exchange. It is necessary to construct lecture contents that foster not only classroom but practical skills as well. According to a research by Sudo, it was found that, in Vietnam, "international nursing practice is experienced early in developing countries with the goal of acquiring an internationality that is continuous in nursing activities, and it has been suggested that it is essential in the training of the nursing personnel required by our globalizing international society" (Sudo & Higuchi. 2014). Further, regarding education contents that are necessary in the future, such as "understanding of different cultures" and "communication ability," to train personnel rich in internationality with practical application ability, it is thought that the necessity of fieldwork, which incorporates real practice will continue to increase. Additionally, educators that emphasize other countries' policies and systems pertaining to health care as education contents were also widely seen.

International nursing education is included "integration and practice of nursing" sphere clearly defined in the regulations provided by the Ministry of Health, Labour and Welfare (Ministry of Health, Labor and Welfare, 2011). However, it is thought that these include a wide variety of contents, such as team medical care and multidisciplinary cooperation, nursing management, medical safety, integration of nursing technology, etc. For that reason, the quality and extent of international nursing education programs differ greatly from university to university according to the educational philosophy of each. Considering this, it is not easy to allot enough time to international nursing education established as its own separate course. Here, since the format of international nursing education is not regulated yet, it may be effective to establish a flexible

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educational program. Even if international nursing education is not established as a course, it is possible to include the response to internationalization from that subject area within lectures in all nursing education programs. If we apply such a multilayered approach to providing international nursing education, we can contribute to training personnel rich in internationality even within the tight curricula of undergraduate programs.

V . Study Limitations and Future Research

Current study has been concentrated only around national universities that provide nursing education and, therefore, does not fully describe the current state of international nursing education in Japan. It is important to research the matter further and provide a comparative review that would include other universities such as private universities as well. Moreover, further analysis of the situation in nursing education and a more specific review of the education program should be made in order to work towards establishing effective international nursing education.

VI. Conclusion

In nursing department of national universities in Japan, 22 universities (52.4%) have established “international nursing” as a compulsory subject. Of these, 16 universities (38.1%) had a full-time nurse as the head educator. As international nursing education has a different curriculum in each university, there is also a large difference in the education time.

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ORIGINAL ARTICLE

Academic Qualification and Job Market Placement: A Bangladesh Study

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ABSTRACT

This desk work study is based on data of some relevant survey, related reports and articles. To study benefit, the paper compares employment of major occupation and level of education and unemployment rate on level of education. It finds evidence of better job position by level of education whilst unemployment rate increases gradually from No-Education level to HSC level; Drops down at the graduation level and then gradually increase at the Masters level. Again, to study wage differentials, the paper compares wage contribution by different level of education attainment. It finds evidence of highest wage rate found in the level Class I-V whereas Technical and vocational level have the lowest wage rate. More interestingly is found that higher education level has lower wage rate than lower education level. Lastly, for both benefits and wage differentials, level of education attainment has less significance among themselves.

＜Key-words＞
Educational qualification, job market placement, labour market, wage

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I. Background

Bangladesh is one of the leading developing countries, the seventh most populous country in the world and one of the most densely populated having about 160 million people where transforming human into resource is one of the immense challenge for her. According to the World Bank (2000) "Bangladesh's greatest strength is its people. Ethnically homogeneous and firmly wedded after much turmoil to the intuitions, they are well known for hard work and resilience under stress" (World Bank, 2002). As a labour abundant country (Woahid, 2009) Bangladesh has huge number of skilled and unskilled labourers. According to the Labour Force Survey (2010) conducted by the Bangladesh Bureau of Statistics 56.7 million people (15 to 64-years-old) are economically active though 54.1 million (male 37.8 million and female 16.2 million) of them are occupied. Moreover 34 percent is under the age of 14, indicating a moderate youth bulge (Kibria, 2011). On the other hand, the rate of growth in labour force is not satisfactory which is lower than the growth of population, moreover, almost 2 million people have been added to the total population compared to nearly 1.6 million job opportunity every year (Basak, 2013).

Land, labour, capital, and technology are the principle factors of production, however, labour is certainly the inevitable components of production process. Bangladesh Bureau of Statistics (BBS) defined labour as "person aged 15 years and above who was either employed or unemployed during the reference period and any person of the same age putting in a minimum of one hour's work in family farm/enterprise for pay or profit during the reference period is considered economically active or labour" (BBS, 2011). Labour market is one of the most important microeconomic markets where both skilled and unskilled labour are important; while, labour market can be understood as the mechanism through which human labour is bought and sold as a commodity and the means by which labour demand is matched with labour supply (Wilton, 2010).According to Basak (2013) importance of labour market is considerably higher in Bangladesh for its being densely population with large number of economically active generation, whereas total working age population raised by 21.4 million over the period of 1999-2000 to 2010 and among the total working age, employed population increased only by 16 million which is counted 65.6 percent of the growing population and 74.8 percent of the working age population, however, creation of employment for the new entrants into the labour force and a great many who are currently underemployed become the key development challenges for the government.

Formal, urban informal and rural informal this three forms of market shaped the labour market of Bangladesh (Titumir & Hossain, 2003) whereas a small portion of labour force works in the formal labour market, however, there are a few published and

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unpublished works on the participation behavior of rural persons in self-employment activities due to microfinance programs (Zohir, 1999; Mahmud, 2000 cited by Basak, 2013). Once more, having a greater number of working age population doesn't automatically ensure growth, however, the society has to invest in them and make them ready for the challenges of growth by improving their level of education, health and skills (Rahman, 2002).

The UNDP (2002) defines human development as- *"Human development is about much more than the raising of national incomes. It is about creating an environment in which people can develop their full potential and lead productive, creative lives in accordance with their needs and interests. People are the real wealth of nations. Development is thus about expanding the choices people have to lead lives that they value. And it is thus about more than economic growth, which is only a means – if a very important one – of enlarging people's choices."*

Economic growth alone is not always enough to achieve higher levels of human development, thus state invests in education, health and social protection, and critically those that promote equality do better even when they experience slower growth (Hendra, 2013). Education is one of the key component in human development process, however, education helps to develop new skills but it's very difficult to answer and make interpretation of the results of econometric analysis while higher rates of girls' education are proven globally to both raise GDP and boost human development outcomes (Hendra, 2013).

Bangladesh is committed to meet the Millennium Development Goals (MDG) and has got remarkable success in all the sectors and subsectors of development especially in education and gender issue while there are several important factors behind this success in boosting human development and gender equality outcomes (Hendra, 2013). In particular, achieving a higher level of girls' secondary education (30.8% compared to 26.6% in India and 18.3% in Pakistan), and significantly higher labour force participation is really a great success for Bangladesh (Hendra, 2013). According to the International Labour Organization (ILO), Bangladesh had a female labour force participation rate of 36% in 2010 compared to 22.3% in India and 21.5% in Pakistan. A variety of courses for disciplines such as technical, vocational, professional and agricultural etc. should offer to achieve development and balanced distribution of manpower for all professions, whereas at present Bangladesh is mainly offering education in "general subjects" thus the vast population of Bangladesh cannot contribute to economic growth by participating in different professions. For developing skill, in association with the ILO and funded by the European Union, the Government of Bangladesh introduced the TVET Reform Project to ensure Bangladesh's competitiveness in the global market and reduce poverty by

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improving the quality of vocational educational and training.

Education as one of the basic rights for every single human being allows people to increase existing and acquire new knowledge, skill and attitude. In most of the states of the world, government is bound to ensure quality education for all by their own constitution whereas Bangladesh has no provision like this in its constitution but the state is very much willing to ensure education for its citizens, not so much dramatic but steady growth in education sector ensure the willingness. It cannot be said that there is no alternative except education for development, however, it can be said that for sustainable development education is one of the prominent component.

Moreover, different theoretical perspectives consider education to be a key agent of national development, either as a way of developing human capacity, increasing the skilled workforce for modernization, or as a matter of personal freedom, developing capability and empowerment (Alam, 2008).Developing individual is a small part or may explain as a first step for overall development but surely this is inevitable for sustainable development, whilst education led an individual to the path of development through this the country or the nation will summit the development. Again, socio-economic development of Bangladesh largely depends on human resources development and there is no alternative way rather than imparting training to our huge unemployed labour force (Ministry of Economics, 2013), moreover, to do so, our children should get proper education and training facilities which will bring up them to apply in our nation building activities (Hosen, Khandoker & Islam, 2010).

Male, female and child these three types of labour is present in Bangladesh labour market while child labour become a burden for every economy as well as a serious problem in any nation, moreover, any job of children always treated as the problem of underemployment through the labour market framework and all child work are strongly prohibited by ILO (Hosen, Khandoker & Islam, 2010). Increasing child labour participation rate lead the nation to lose huge potential resource therefore child labour issue demands more concern while linking inversely with education in terms of execution whereas educating children is opening the way to get human resource of nation while (Hosen, Khandoker & Islam, 2010). Country like Bangladesh where a huge portion of family live under the poverty line which demand more family income government should introduce more life oriented education program in the post primary level which will be helpful for getting job as well as ensuring self-employment and prevent child labour as well as drop out from formal education.

According to the Bangladesh Labour Force Survey (2010) out of 56.7 million economically active people 39.5 and 17.2 million of male and female were found

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economically active respectively. Though gender discrimination in wage rate has remained, female wage rate has considerably increased according to the increased level of education, resulting in higher productivity and long working hours for women thus poverty line is decreasing. Good quality in secondary education is extending opportunities to poor rural households has the potential of improving labour market outcomes further for both male and female labour force (World Bank, 2007).

II. Significance of the Study

There is a common premise that education is a passport for job, whilst employment opportunity differ from job market context. This paper assesses the present situation of job market placement in Bangladesh in light of education. It looks separately at the benefit of education attainment for getting better job and wage differentials by level of education attainment. Contribution in labour market is increasing among all group of people though quality of employees is poor and not specialized. Therefore, a group of experts suggest that to improve the quality of employees, Bangladesh's people need to be trained in modern professional-based and job oriented technical, technological and vocational programs (Alam, 2008) though it is neglected for a long time in the country. Even some people think that practical experience of Bangladesh does not support previous suggestion, rather here sometimes found the opposite scenario where uneducated or less educated are placed in higher job than the educated (Shahriar, 2012). In that context, there need to examine the relationship between educational qualification and job market placement of the employees in Bangladesh. Therefore, this study aimed to explore the relation between job market and educational qualification.

III. Study Objective

1. General Objective

To determine the relationship between academic qualification and job market placement in Bangladesh

2. Specific Objectives

1) To determine the present status of job market in light of education
2) To assess the relationship between wage and level of education in job market

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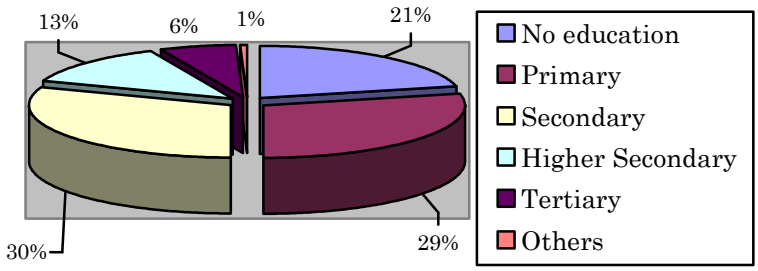
IV. Methods

The study is solely based on a review and analysis of available data, primarily data are not collected. The Labour Force Survey (LFS) Bangladesh, 2013, Wage Rate of Working Poor in Bangladesh, 2009-10 and Household Income and Expenditure Survey (HIES), 2010 are the data sources for the empirical analysis in this study. These three surveys were conducted by the Bangladesh Bureau of Statistics (BBS) under the Statistics and Information Division (SID) of Ministry of Planning. The survey strategy of the LFS 2013 was stratified and clustered, so that each household in the population had an equal probability of inclusion and data was collected from a sample of 36242 household from 1512 sample enumeration areas distributed across all the 64 districts of the country. The survey covered both urban and rural areas. The sample frame of the survey was based on the Population and Housing Census 2011. Data was collected within the period of January 2013 to December 2013 using a questionnaire. Data was captured using Census and Survey Processing System (CSPro) through a data entry screen. Descriptive statistical methods were used for data analysis. The report was published in October, 2015. Besides, for the Wage Rate of Working Poor in Bangladesh, 2009-10 was conducted in 2009 & 2010 and published in 2011. The survey was conducted in both rural and urban areas. A multi-stage stratified random sampling technique was used to select the sample locations and respondents. Again, the Household Income and Expenditure Survey (HIES), 2010 was carried out during the period of February 2010 to January 2011 which covers 12,240 households, drawn from 612 Primary Sampling Units (PSUs), from 16 strata - 6 rural, 6 urban, and 4 Statistical Metropolitan Areas. The report was published in December, 2011. In this article descriptive statistics technique (frequency, percentage) was used to analyze quantitative findings of the surveys. A further survey of secondary literature (Government, Nongovernment report on labour force supply, different articles of Bangladesh Institute of Development Studies, UNICEF, ILO and other UN organizations reports, academic research articles, etc.) was done to supplement the findings. The data were compiled by MS-Excel and MS- word computer software.



<Figure 1> Employed persons aged 15 years and over (percent) by level of education in Bangladesh (Source: Labour Force Survey Bangladesh, 2013)

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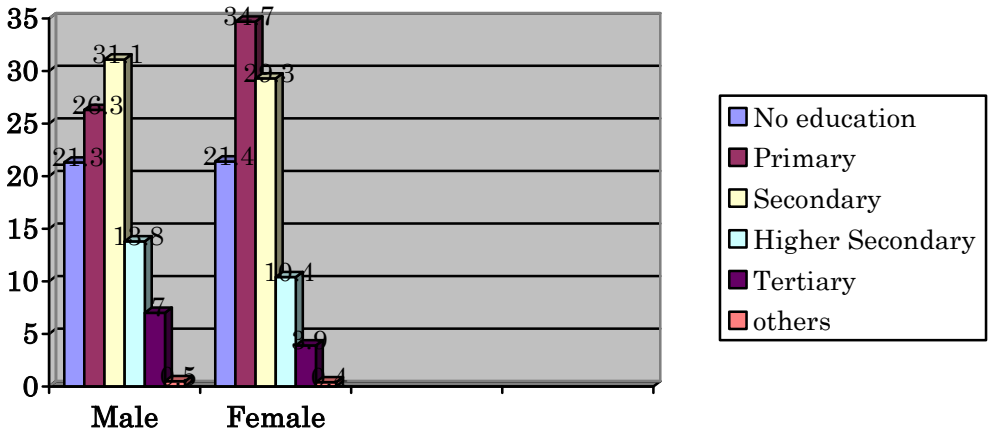
V. The Results of the Research on the Job Market Placement

1. Present Status of job market of Bangladesh in light of education

The graph shows the trend of employment rate with the level of education in Bangladesh. It reveals that 21.3% of the total employed population had no education at all whereas 28.7% completed primary education. This chart also represents that 30.6% employed people completed secondary education. According to these data only 12.8% people completed higher secondary education who were employed whilst only 6.1% employed persons completed tertiary education and others 0.4%. It shows that the employment rate increases from no education level to secondary level but the employment rate falls in the higher secondary level. The rate is lower in the tertiary level of education and lowest in the others level of education.

The figure-2 reveals the trend of Employment rate with education and by gender. From the chart it can be seen that female who had no education as well as who completed primary level of education were more employed than male with same level educational qualification. According to the chart 21.4% female with no education were employed, on the other hand 21.3% male with no education were employed. 34.7% female were employed who completed primary level education and 26.3% male were employed who completed the same level. It is also seen that female who completed secondary, higher secondary, tertiary and others level of education were less employed than the male who completed the same level of education. For the secondary level, we can see that 31.1% male and 29.3% female were employed. And for the higher secondary category 13.8% male and 10.8% female were employed. If we consider the tertiary level of education we can see that 7% male were employed, on the other hand only 3.9% were employed.



<Figure 2> Employed persons aged 15 years and over (percent) by level of education and gender in Bangladesh (Source: Labour Force Survey Bangladesh, 2013)

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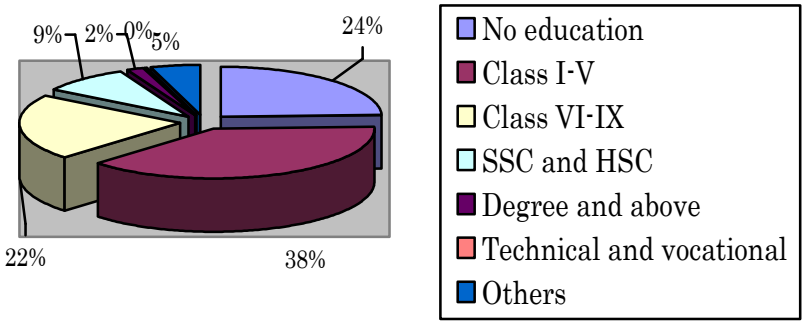
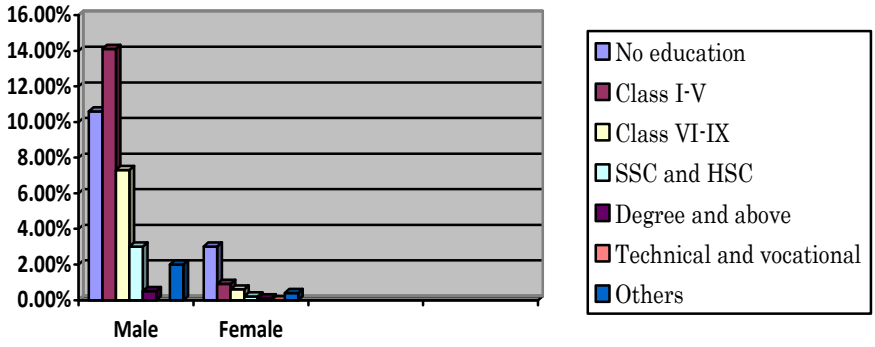
2. Wage differential by level of education



<Figure 3> Wage differentiate by level of education in Bangladesh (Source: Wage Rate of Working Poor in Bangladesh, 2009-10)

The pie diagram shows the percentages of contribution to the national wage by level of academic qualification. From the graph it is seen the higher the education the lower the contribution to the national wage. It is seen that the wage earner with primary level of academic qualification contribute the most to the national wage and the figure is 38%. On the other hand, the contribution to the national wage is the lowest (2%) from wage earners with degree and above qualification. Furthermore, the contribution of population with no education places the second in the list with 24% of the total wage earned. Wage earner with qualification of grade level six to nine contribute 22% of the total wage which followed by the group with qualification of SSC and HSC with 9%. Interestingly, Technical and Vocational Education seems to have no contribution (0%) to the wage earned.



<Figure 4> Wage differentiate by level of education and gender in urban area (Source: Wage Rate of Working Poor in Bangladesh, 2009-10)

The above graph shows the percentages of wage earner by level of education and gender in rural. It is seen that the percentages of wage earner decreases with level of education. Further, it also reveals that the percentage of male wage earners outweighed female wage earners. It is seen that the highest percentages of wage earner come with

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primary level of academic qualification; the figure are 14.1% for male and 0.9% for female. In fact almost 14% wage earners come with no academic qualification; around 11% of them are male and the rest 3% are female. The figure drops to 7.30% for male and 0.60% for female wage earners with academic qualification of grade six to grade nine. Only 0.5% of the male wage earners come with qualification of degree and above, the figure is 0.1% for female. The data did not find any wage earner with technical and vocational education in rural context.

<Table 1:> Average Per Capita Income (Tk) by Residence and by Educational Level of Head

Educational Attainment	Average Per Capita Income (Tk)					
	National		Rural		Urban	
	Male	Female	Male	Female	Male	Female
No class passed	1807	2262	1730	2065	2161	3240
Class I-V	2205	3291	1994	3011	2828	4147
Class VI-IX	2711	3356	2499	3142	3192	3954
SSC/HSC equivalent	4098	5958	3342	6041	5109	5882
Graduate equivalent	5327	6109	3881	5883	6220	6121
Post graduate	5800	10674	3789	0	6604	10674
Doctor	24064	0	0	0	24064	0
Engineer	11822	0	5167	0	12603	0
Others	5477	2868	2171	0	8527	4119
Total	2517	4119	2083	2509	3704	4107

Source: Household Income and Expenditure Survey (HIES), 2010

Average per capita income (Tk) by residence and by educational level of head is presented in the Table-01. According to the data presented in the table, per capita income of male-headed households is Tk. 2,083 which is Tk. 2,509 for female headed households in the rural area. Per capita incomes of illiterate male and female headed households are Tk.1,730 and Tk. 2,065 respectively, whereas the per capita income of households with heads who passed class I-V is Tk. 1,994 for male and Tk. 3,011 for female headed households. The per capita income of male heads with SSC/HSC or equivalent is Tk. 3,342 as against Tk. 6,041 female headed households.

In the urban area, per capita income of male and female headed households is Tk.3,704 and Tk. 4,107 respectively. Per capita income of illiterate male headed households is Tk. 2,161 and similar income is Tk. 3,240 for illiterate female headed households. Per capita income of households with head having education of class I-V is Tk. 2,828 for male headed and Tk. 4,147 for female headed households. For heads with graduate or equivalent education, the per capita income of male headed households is Tk. 6,220 which is Tk. 6,121 for female headed households.

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VI. Considerations and Conclusions

According to the Bangladesh Bureau of Statistics on date, unemployment rate in Bangladesh decreased to 4.30 percent in 2014 from 4.50 percent in 2013 whereas the average rate was 4.50 percent from 2003 until 2014, reaching an all-time high of 5.10 percent in 2009 and a record low of 4.30 percent in 2006. The unemployment rate measures the number of people actively looking for a job as a percentage of the labour force. It is seen that education level and employment rate have almost opposite relation with each other. People with less educational qualification are more employed than the people who are highly educated. So it can be easily said that employment rate in Bangladesh gradually increases from no education level to secondary level. But in the level of higher secondary the employment rate is so poor. The employment decreases more at the level of tertiary education. The people who completed higher education face the unemployment problem most.

It is also seen that the female with no education are more employed than the male with no education. According to the Labour Force Survey 2013 female who are not educated at all and who completed just primary education are more employed (21.4% and 34.7%) than the same level completed male. But in consideration of other level of education it is seen that, men are more employed than women. In other words, educated women are not that much employed like men in Bangladesh. In the secondary education level and higher secondary level we can say that the differences between male employment rate and female employment rate are not that much high (secondary level-male 31.1% and female 29.3%, higher secondary level- male 13.8% and female 10.4%). But in the tertiary level the gap between male employment rate and female employment rate is alarming (male 7% and female 3.9%). It proves that, women who are highly educated do not contribute in the economic growth.

It is seen that education level does not have any positive correlation with employment status. It can be said a high rate of unemployment and the demand for foreign exchange persist a great challenge for the country which has led the government policies to promote migration of workers to labour deficit countries (Ahmed, 2013). Besides, the Household Income and Expenditure Survey (HIES), 2010 found a positive correlation among level of education and average per capita income of the head of household. Though there is also a positive correlation among the gender and residence of the house head. Here, head of household is defined as a member of the household who is the decision-maker regarding the different activities of the household. Survey revealed that the average per capita income of the head of household is increased with their level of education.

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Bangladesh seeks to come out from the list of Low Income Status countries and write her name in the list of Middle Income Status country by 2021, therefore she must have to increase the proportion of higher value added manufacturing from 18 to 25 % of the gross domestic product (GDP). Keeping this objective in mind government along with the donor agencies working relentlessly. Subsequently, a lots of works has been done and planned to be done such as increase investment, improve labour productivity through increasing skills, and increase trade. However, self-confidence, autonomy, increased skill development and knowledge of community services have to be ensure for individual development whereas individual skills development is the most important part of holistic development. Addressing this challenges, the government of Bangladesh has been established the National Skills Development Council (NSDC), the apex approval authority on skills in country (which is headed by Prime Minister) is the supreme body for national skills development agenda.

It is found that, at present no such scope is open for the students to access and pursue education and training for achieving higher levels of qualification but government have plan to establish some skill centers where they can develop their skills though it's in planning stage. Recently some initiative have been taken from the Skills & Training Enhancement Project (STEP) to give the recognition of knowledge and skills obtained on-the-job and evolve systems of equivalence between formal, non-formal and informally acquired competence so that individuals' achievements can be calibrated. There is a certificate course under technical board named SSC (vocational) which allow students to transfer in general education.

Labour market earnings may be possible to increase through improving the quality (in terms of teachers and facilities) of rural and national educational institutions (CAMPE, 1999). Hence, for accelerating economic development of the country and addressing some economic issues such as unemployment problems, poverty reduction and increasing foreign exchange reserve, remittance sent by the Bangladeshi expatriates make significant contribution (Ministry of Economics, 2013).

Following recommendation could be given on the basis of the study findings-

(1) More opportunities should be provided specially for the female. The Govt. of the peoples' Republic of Bangladesh has already initiated few steps to provide more job opportunity for the female. But with some social and religious bindings female are not getting much opportunity of having job. Awareness build up from both govt. and non-govt. sectors can play a major role to overcome this bindings.

(2) Proper remuneration should be provided to the employees. Major components of job satisfaction like recognition, respect, responsibilities, job security etc. should be present in the job sector.

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(3) Employees' job mapping surveys should be taken place for identifying the proper reason of unemployment and interest lever of the eligible employees.

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ORIGINAL ARTICLE

The Influence of Living Environment on Independence Level of Special Nursing Home Residents

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ABSTRACT

In this study, we examined the changes in independence levels of old residents after the shift living environment from conventional care and shared rooms toward unit care and private rooms. The study involved 38 (male: 7; female: 31; mean age: 86.2) residents of a special nursing home, which was changed from a conventional to unit-type facility as a shift toward unit care. Their care levels based on the Long-term Care Insurance System were 4 or higher in 70% of all cases. Their levels of ADL independence were measured using the FIM before (pre-) and after (post-shift period) the shift, and the following mean scores were obtained from each FIM sub-scale during the pre- and post-shift periods: <bladder management>: 2.47 and 2.32; <transfers - toilet>: 3.16 and 2.81; and <memory>: 3.3 and 3.05, respectively, revealing a significant decrease in the independence level after the shift. This indicates the necessity of providing care for individuals using such facilities, particularly elderly residents, in consideration of their adaptability to environmental changes and those in care service systems.

＜Key-words＞
activities of daily living, special nursing home, living environments, unit care, functional independence measure

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I. Introduction

Special nursing homes are facilities for the elderly with difficulty in receiving nursing care in their homes despite their need for assistance at all times due to marked mental and/or physical impairment (Annual Health, Labour and Welfare Report, 2007). Such facilities provide: bathing, eating, and toileting (care workers and nurses); rehabilitation counseling (occupational/physical therapists and care managers); cleaning and laundry (care workers); and shopping, recreation, and other services to support residents' daily lives. They mainly consist of: resident rooms, equipment to be shared, such as bathrooms and toilets, and dining/living rooms as common living spaces. Based on the resident room design and care service system, special nursing homes are classified into 2 types of facility: conventional: each resident room comprises multiple beds, and the living unit ('unit') is not set at 10 persons; and unit-type: a private room is allocated to each resident, and a common living space is created based on the unit, adopting the unit care system. These facilities had aimed to help residents lead their daily lives with a sense of security by monitoring and caring for them in accordance with their levels of need. However, the Ministry of Health, Labour, and Welfare noted the following points in its report in 2004: the fact that the conventional care service system had forced care-dependent elderly individuals to lead a group life in conventional facilities, in order to provide care needed for them; marked differences between such a living environment (covering group care, shared rooms, and large dining rooms) and residents' previous lives, and the inappropriateness of the former to support the elderly's independence; and an increasing demand for care, attaching importance to individual residents' personalities and life rhythms (individualized care) (Ministry of Health, Labour and Welfare, 2004). Oomori observed that conventional facilities are generally based on a hospital model, which is characterized by resident rooms with 4 to 8 beds consecutively distributed alongside or middle corridors, and it is inappropriate to use the flow process focusing on work efficiency even in settings for support, mainly care (Omori W et al, 2002). Similarly, Ogasawara proposed reviewing methods to provide care, including ensuring privacy and appropriate living conditions, in special nursing homes as a living environment (Ogasawara, 1999).

In 2001, the Ministry of Health, Labour, and Welfare presented a new type of special nursing home, in which all rooms are private based on the unit care system (unit-type facilities) to provide care while attaching importance to residents' dignity (Ministry of Health, Labour and Welfare, 2001). These facilities aim to enable residents to continue their 'normal home lives' in accordance with their life rhythms by maintaining privacy and creating living environments with a home atmosphere (Muraoka, Kitajima & Honna, 2003; Akagi, 2009). It has been reported that the provision of care while respecting individuals' own paces and intentions led to changes in care workers' attitudes, such as refusing to provide care less frequently (Yokojima, 2004). In addition to this, Toyama

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noted the following changes related to a shift toward private rooms and unit care: the lengths of residents' stays in their rooms and common living spaces decreased and increased, respectively, consequently promoting their activities out of bed and communication among them; their frequencies of eating in bed and the dining room decreased and increased, respectively, consequently enhancing their dietary intakes; and the numbers of portable toilets distributed and shared toilets used decreased and increased, respectively (Toyama, 2002).

Sanmiya explained that the majority of conventional facilities were founded after the establishment of the Ten-Year Strategy to Promote Health Care and Welfare for the Aged (Gold Plan), and, therefore, they are still too new to be rebuilt, indicating the necessity of improving facility environments to adopt the unit care system as a challenge (Sanmiya & Kataoka, 2004). In line with this, living environments for facility users have been considered in terms of privacy, and one of these measures is a shift of resident rooms from conventional shared to private rooms, supported by subsidies allocated by administrative bodies. Under these circumstances, the number of special nursing homes adopting the unit care system is increasing (Kishida & Ono, 2009). In a survey conducted by the Ministry of Health, Labour, and Welfare in FY 2015, unit care was being provided in 35.9% of all special nursing homes, 34.9 and 1.0% of which were unit- and partially unit-type facilities, respectively. It was also shown that 34.2 and 33% of all residents of special nursing homes were classified into care levels 4 and 5, respectively, based on the Long-term Care Insurance System (Ministry of Health, Labour and Welfare, 2015).

A large number of previous studies on the adoption of the unit care system involved facility care workers. They revealed various problems related to organizational operations, which occur after a complete shift toward private rooms and unit care, including: difficulty in allocating sufficient personnel, resulting in fragmented work shifts; a reduced quality of care for facility users due to an increased psychological burden loaded on care workers; and the necessity of reviewing work procedures (Suzuki, 2005). Jang reported that workers tended to show signs of cumulative fatigue more frequently in facilities providing care for small groups, compared with conventional facilities (Jang & Kuroda, 2008). The adoption of the unit care system has also been reported to promote negative attitudes toward care (burnout) among care workers (Tanabe, Adachi & Ohgubo, 2005; Chozo & Kuroda, 2007), highlighting the importance of appropriate education for them, particularly unexperienced workers who are vulnerable to burnout (Sanmiya & Kataoka, 2004; Suzuki, 2007).

The complete shift toward private rooms and unit care should aim to not only benefit facility staff, but also protect residents' privacy, and provide appropriate, individualized care. However, its influences on residents have rarely been examined, except for a limited number of studies on awareness of life (Mibu, 2010, 2011)

By providing such care, it may be possible to maintain or improve residents' activities of daily living (ADL).

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In this study, we examined the changes in independence levels of old residents after the shift living environment from conventional care and shared rooms toward unit care and private rooms.

II. Subjects and Methods

Residents of a special nursing home, in which buildings were newly organized, and conventional shared resident rooms were changed to unit-type private rooms to adopt the unit care system, were studied to compare their levels of ADL independence before and after such a shift toward unit care ('shift').

1. Facilities

In the study facility, the quota was set at 50 before and 90 after the shift. The number of care workers was also increased with this. Table 1 shows the characteristics of the facility before and after the shift, covering the quota (number of beds), number of staff members, and their qualifications. Concerning facility environments, the facility had previously comprised 17 rooms with 2-4 beds, in addition to dining rooms and bathrooms on each floor. After the shift, it consisted of 70 private rooms, 15 two-bed rooms, and dining rooms and common spaces distributed for every 10 residents as 1 unit. Figures 1 and 2 outline facility environments before and after the shift.

<Table1 > Facilities

		before	after
		Conventional Facility	Unit-type Facility
Capacity (n)		50	90
Facilities form		60 rooms with multiple beds	40 rooms with multiple beds
			60 private rooms
		(10 beds for short stay included)	(10 beds for short stay included)
The number of staff (full-time)	Care workers	36.69	54.86
	Nurses	4	5
	PT/OT[1)]	1	1
	Consultants	1	2
	Care managers	1	1
	Registered dieticians	1	1
	Others	5.64	4.52
Staff's qualifications	Care workers	13	19
		(4 Graduated from the Training Institutions)	(8 Graduated from the Training Institutions)
	Helpers	24	37
	Social workers	1	1
	Nurses	4	5
	PT/OT[1)]	1	1
	Care managers	4	5
	Registered dieticians	1	1
	[1)]PT: physical therapists OT:occupational therapists		

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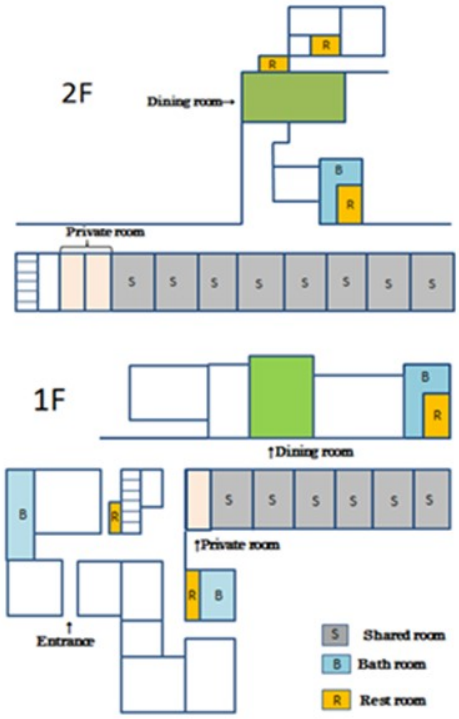
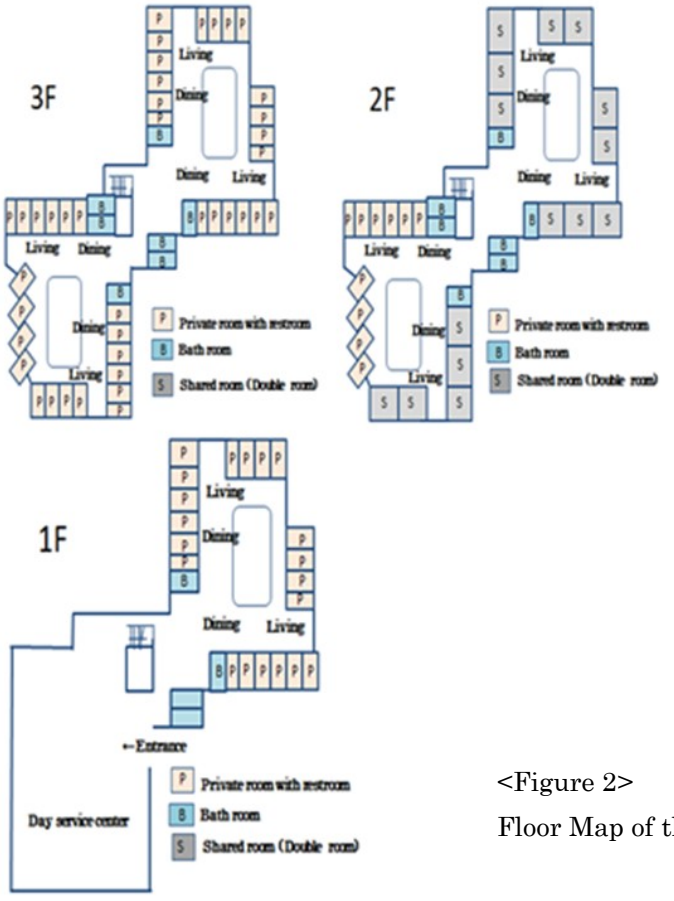


<Figure 1>
Floor Map of the Conventional Facility



<Figure 2>
Floor Map of the Unit-type Facility.

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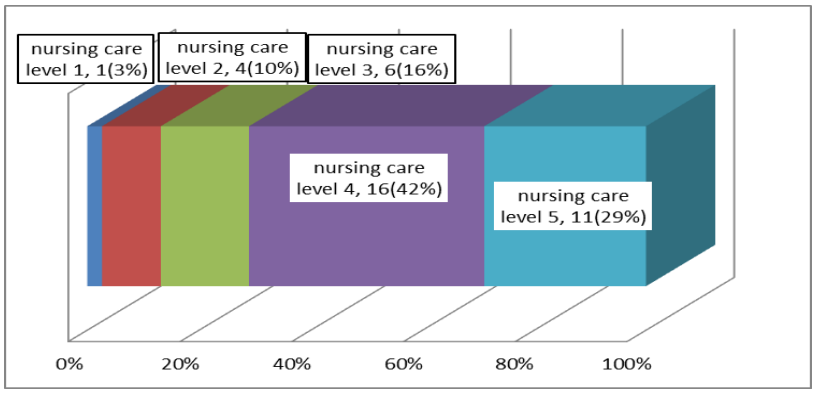
2. Subjects

Among the 50 residents, who had previously lived in conventional shared rooms, 38 (7 males and 31 females) aged 86.2±10.6 (range: 49-104), who began to live in private rooms and receive unit care after the shift, were studied. Their care levels were as follows: 1: 1; 2: 4; 3: 6; 4: 16; and 5: 11, revealing that 70% of these residents were classified into care level 4 or higher (Figure 3). Residents whose physical conditions worsened due to recurrence or other causes and those admitted to hospitals during the study period were excluded.

As ethical considerations, the residents were previously provided with explanations of personal information use, and such information was strictly managed. Furthermore, data analysis was performed after adopting measures to prevent the identification of facilities and individuals.



<Figure 3> Nursing care levels (based on assessment of care requirements) (%)

*The Long-term Care Insurance System, a societal system of mutual assistance for elderly care, was founded in Japan in 2000. In this system, based on the decision by the Long-term Care Approval Board, the applicant will be judged either unqualified (self-reliant), or either Support Required (1 and 2) or Long-term Care Required (nursing care levels 1-5). With need of nursing care level 1, assistance shows a necessary state for a walk or bathing. Need of nursing care level 5 shows the state that it is the severest, and assistance is necessary for overall everyday lives.

3. Outcome measures

To compare the residents' levels of ADL independence, assessment was conducted twice: 1-4 months before ('pre-shift period') and 1-4 months after the shift, by 1 physical therapist working in the study facility, using the Functional Independence Measure (FIM). *FIM is an ADL assessment scale with sufficient reliability and validity. It measures the ability to actually perform each activity. The level of independence in performing each activity is scored on a 7-point basis from 1 to 7, based on the total score and those from the 18 subscales listed below: 1: the patient expends less than 25% of the effort; 2: the patient expends between 25 and 49% of the effort; 3: the patient expends between 50 and 74% of the effort; 4: the patient expends 75% or more of the effort; 5: the patient requires setup, verbal instructions, or supervision; 6: the patient needs considerable time or assistive devices to perform the activity; and 7: the patient performs the activity independently. The full score is 126.

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4. Analysis

The total FIM and sub-scale scores during the pre- and post-shift periods were compared (Wilcoxon signed rank test). For analysis, the statistical software SPSS 18 (IBM) was used, with the significance level set at <5%.

III. Results

The total FIM and sub-scale scores during the pre- and post-shift periods were as follows:

1. Scores from each FIM sub-scale during the pre- (conventional) and post-(unit-type) shift periods.

The care level was 4 or higher in 70% of all cases, indicating that a large number of the residents required high-level assistance with movements for ADL, excluding eating and grooming. Table 2 shows their scores from each FIM sub-scale during the pre- and post-shift periods.

Eating

During the pre- and post-shift periods, 16 (42.1%) showed a score of 5, indicating that a large number of the residents required setup, verbal instructions, or supervision for eating during both periods.

Grooming

During the pre- and post-shift periods, 15 (39.5%) and 11 (28.9%), respectively, showed a score of 5, indicating that a large number of the residents required setup, verbal instructions, or supervision for grooming during both periods.

Bathing

During the pre- and post-shift periods, 14 (36.8%) and 16 (42.1%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Dressing - upper body

During the pre-shift period, 11 (28.9%) and 10 (26.3%) showed scores of 1 and 2, respectively. These numbers were 11 (28.9%) and 14 (36.8%), respectively, during the post-shift period, indicating that a large number of the residents expended less than 50% of their efforts during both periods.

Dressing - lower body

During the pre- and post-shift periods, 21 (55.3%) and 23 (60.5%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

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Toileting

During the pre- and post-shift periods, 17 (44.7%) and 19 (50%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Bladder management

During the pre- and post-shift periods, 15 (39.5%) and 17 (44.7%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Bowel management

During the pre- and post-shift periods, 16 (42.1%) and 18 (47.4%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Transfers - bed/chair

During the pre- and post-shift periods, 8 (21.1%) and 10 (26.3%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Transfers - toilet

During the pre- and post-shift periods, 12 (31.6%) and 17 (44.7%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Transfers - tub/shower

During the pre- and post-shift periods, 17 (44.7%) and 18 (47.4%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Locomotion - walk

During the pre- and post-shift periods, 29 (76.3%) and 26 (68.4%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Locomotion - wheelchair

During the pre- and post-shift periods, 13 (34.2%) and 15 (39.5%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods. The numbers of non-wheelchair users were 9 and 8, respectively.

Locomotion - stairs

During the pre- and post-shift periods, all residents, excluding 1 whose score was 2, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

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Communication - comprehension

During the pre- and post-shift periods, 14 (36.8%) and 13 (34.2%), respectively, showed a score of 4, indicating that a large number of the residents expended 75% or more of their efforts during both periods.

Communication - expression

During the pre-shift period, 10 (26.3%) and 11 (28.9%) showed scores of 3 and 4, respectively. These numbers were 13 (34.2%) and 8 (21.1%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 50% of their effort during both periods.

Social cognition - social interactions

During the pre-shift period, 8 (21.1%) and 9 (23.7%) showed scores of 3 and 4, respectively. These numbers were 10 (26.3%) and 10 (26.3%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 50% of their effort during both periods.

Social cognition - problem-solving

During the pre-shift period, 14 (36.8%) and 13 (34.2%) showed scores of 2 and 3, respectively. These numbers were 15 (39.5%) and 12 (31.6%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 25% of their effort during both periods.

Social cognition - memory

During the pre-shift period, 11 (28.9%) and 11 (28.9%) showed scores of 2 and 3, respectively. These numbers were 14 (36.8%) and 8 (21.1%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 25% of their effort during both periods.

2. Comparison of scores from each FIM sub-scale during the pre- (conventional) and post- (unit-type) shift periods

Table 3 compares the total FIM and sub-scale scores during the pre- and post-shift periods. During both periods, <stairs>, <walk>, and <dressing - lower body>-related scores were low, indicating low independence levels. The mean total FIM scores were 52.57 and 51.16, respectively; the value was higher in the former, but the difference was non-significant. Those from the other sub-scales were as follows: <bladder management>: 2.47 and 2.32; <transfers - toilet>: 3.16 and 2.81; and <memory>: 3.3 and 3.05, respectively, revealing a marked decrease during the post-shift period. There were no significant differences between the periods in the score related to: <eating>, <grooming>, <bathing>, <dressing - upper body>, <dressing - lower body>, <toileting>, <bowel management>, <transfers - bed/chair>, <transfers - tub/shower>, <walk>, <wheelchair>, <stairs>, <comprehension>, <expression>, <social interactions>, or <problem-solving> (Wilcoxon signed rank test, $p<0.05$).

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<Table 2> Results: Functional Independence Measure

The motor subscale includes:		FIM1	FIM2	FIM3	FIM4	FIM5	FIM6	FIM7	total
Eating	before (n)	5	1	2	2	16	11	1	38
	(%)	13.2	2.6	5.3	5.3	42.1	28.9	2.6	100.0
	after (n)	6	1	1	4	16	7	3	38
	(%)	15.8	2.6	2.6	10.5	42.1	18.4	7.9	100
Grooming	before (n)	5	7	3	15	5	3	0	38
	(%)	13.2	18.4	7.9	39.5	13.2	7.9	0	100.0
	after (n)	7	5	7	11	4	4	0	38
	(%)	18.4	13.2	18.4	28.9	10.5	10.5	0	100.0
Bathing	before (n)	14	12	5	7	0	0	0	38
	(%)	36.8	31.6	13.2	18.4	0	0	0	100.0
	after (n)	16	10	6	6	0	0	0	38
	(%)	42.1	26.3	15.8	15.8	0	0	0	100.0
Dressing, upper body	before (n)	11	10	4	7	5	1	0	38
	(%)	28.9	26.3	10.5	18.4	13.2	2.6	0	100.0
	after (n)	11	14	2	5	5	1	0	38
	(%)	28.9	36.8	5.3	13.2	13.2	2.6	0	100.0
Dressing, lower body	before (n)	21	8	3	2	3	1	0	38
	(%)	55.3	21.1	7.9	5.3	7.9	2.6	0	100.0
	after (n)	23	6	2	3	3	1	0	38
	(%)	60.5	15.8	5.3	7.9	7.9	2.6	0	100.0
Toileting	before (n)	17	10	2	2	3	4	0	38
	(%)	44.7	26.3	5.3	5.3	7.9	10.5	0	100.0
	after (n)	19	9	1	3	3	3	0	38
	(%)	50.0	23.7	2.6	7.9	7.9	7.9	0	100.0
Bladder management	before (n)	15	9	5	3	3	2	1	38
	(%)	39.5	23.7	13.2	7.9	7.9	5.3	2.6	100.0
	after (n)	17	9	4	3	2	2	1	38
	(%)	44.7	23.7	10.5	7.9	5.3	5.3	2.6	100.0
Bowel management	before (n)	16	6	6	10	0	0	0	38
	(%)	42.1	15.8	15.8	26.3	.0	0	0	100.0
	after (n)	18	6	7	5	2	0	0	38
	(%)	47.4	15.8	18.4	13.2	5.3	0	0	100.0
Transfers	before (n)	8	7	5	5	5	7	0	37
bed/chair/wheelchair	(%)	21.1	18.4	13.2	13.2	13.2	18.4	0	97.4
	after (n)	10	7	7	5	4	5	0	38
	(%)	26.3	18.4	18.4	13.2	10.5	13.2	0	100.0
Transfers	before (n)	12	3	6	6	3	7	0	37
toilet	(%)	31.6	7.9	15.8	15.8	7.9	18.4	0	97.4
	after (n)	17	1	7	3	5	5	0	38
	(%)	44.7	2.6	18.4	7.9	13.2	13.2	0	100.0

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The cognition subscale includes:		FIM1	FIM2	FIM3	FIM4	FIM5	FIM6	FIM7	total
Transfers	before (n)	17	9	4	3	4	0	0	37
bath/shower	(%)	44.7	23.7	10.5	7.9	10.5	0	0	97.4
	after (n)	18	9	5	2	4	0	0	38
	(%)	47.4	23.7	13.2	5.3	10.5	0	0	100.0
Walk	before (n)	29	2	0	1	2	3	0	37
	(%)	76.3	5.3	.0	2.6	5.3	7.9	0	97.4
	after (n)	26	3	1	5	0	3	0	38
	(%)	68.4	7.9	2.6	13.2	.0	7.9	0	100.0
Wheelchair	before (n)	2	7	13	2	3	6	5	38
	(%)	5.3	18.4	34.2	5.3	7.9	15.8	13.2	100.0
	after (n)	1	7	15	5	0	4	6	38
	(%)	2.6	18.4	39.5	13.2	.0	10.5	15.8	100.0
Stairs	before (n)	36	1	0	0	0	0	0	37
	(%)	94.7	2.6	0	0	0	0	0	97.4
	after (n)	37	1	0	0	0	0	0	38
	(%)	97.4	2.6	0	0	0	0	0	100.0
Comprehension	before (n)	1	7	8	14	2	2	3	37
	(%)	2.6	18.4	21.1	36.8	5.3	5.3	7.9	97.4
	after (n)	0	9	9	13	3	1	3	38
	(%)	0	23.7	23.7	34.2	7.9	2.6	7.9	100.0
Expression	before (n)	1	5	10	11	4	3	3	37
	(%)	2.6	13.2	26.3	28.9	10.5	7.9	7.9	97.4
	after (n)	0	7	13	8	4	3	3	38
	(%)	0	18.4	34.2	21.1	10.5	7.9	7.9	100.0
Social interaction	before (n)	2	6	8	9	7	4	1	37
	(%)	5.3	15.8	21.1	23.7	18.4	10.5	2.6	97.4
	after (n)	3	6	10	10	5	2	2	38
	(%)	7.9	15.8	26.3	26.3	13.2	5.3	5.3	100.0
Problem solving	before (n)	1	14	13	4	5	0	0	37
	(%)	2.6	36.8	34.2	10.5	13.2	0	0	97.4
	after (n)	2	15	12	3	6	0	0	38
	(%)	5.3	39.5	31.6	7.9	15.8	0	0	100.0
Memory	before (n)	3	11	11	4	3	2	3	37
	(%)	7.9	28.9	28.9	10.5	7.9	5.3	7.9	97.4
	after (n)	6	14	8	2	3	2	3	38
	(%)	15.8	36.8	21.1	5.3	7.9	5.3	7.9	100.0

Subsequently, the residents with significant decreases in their <bladder management>, <transfers - toilet>, and <memory>-related scores during the post-shift period were examined. The 5 residents with decreases in their <bladder management>-related scores were characterized by an older age, with a mean age of 94 (range: 85-100), and their mean score in this domain decreased from 3 (5-2) to 1.8 (3-1). Similarly, the mean age of the 5 residents, whose <transfers - toilet>-related scores decreased during the post-shift period, was 91 (83-100), and their mean score in this domain decreased from 22 (6-2) to 2.44 (5-1). The 8 residents with decreases in their <memory>-related scores were also older, with a mean age of 93 (85-104), and their mean score in this domain decreased from 3.25 (2-5) to 2 (1-3).

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IV. Discussion

This study suggested that the independence levels of old residents decreased after changes in living environment. However, our study design cannot reveal whether residents' independence levels were influenced by the changes in care service systems and the style of rooms, or by the merely adaptation to living environment. Therefore, further research is needed to investigate the relation between independence levels of residents, care service systems and the style of rooms.

Unit care attaches importance to individual facility users' personalities and life rhythms to help them lead a daily life while establishing favorable relationships with others in a living environment similar to their homes. A complete shift toward private rooms and unit care makes the following approaches feasible: 1) creating more home-like living environments for elderly residents; 2) protecting their privacy and dignity by allocating a private room to each of them; and 3) providing individualized care, attaching importance to their dignity and personalities. At these points, the adoption of the unit care system has been promoted to increase residents' quality of life and levels of satisfaction, as well as to maintain and improve their levels of ADL independence.

In this study, significant decreases in residents' levels of independence in < bladder management >, <transfers - toilet>, and <memory>, representing ADL, were observed after such a shift. The subjects' care levels tended to be high, indicating low levels of independence, and facility staff's direct assistance was needed in most cases.

Unlike those in locomotion-related activities, such as <walk> and <stairs>, the residents' levels of independence in <bladder management> and <transfers - toilet> were also high during the pre-shift period. On the other hand, as excretion requires frequent daily care, the influence of changes in care environments and service systems on the level of independence in related activities, such as < bladder management > and <transfers - toilet>, may have been more marked. The adaptability of elderly facility users aged 75 or over to environmental changes is likely to be reduced, and their increased vulnerability to stress and damage may be an important risk factor (Sasaki, Hanyu & Nagashima, 2004; Tahara, Horiuchi & Yasuda, 2013).

As the present study also examined such users, with a mean age of 86, periods shorter than 4 months were regarded as insufficient to observe their adaptability to environmental changes and those in care service systems. Their scores related to <memory> confirmed their insufficient adaptation to new environments and changes in living conditions. In fact, the residents whose scores in this domain markedly decreased during the post-shift period were older, supporting the results of the above-mentioned studies.

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<Table 3> Results: Comparison of Functional Independence Measure

		Mean	N	SD	Z	Asymptotic significance levels (two-sided)
Eating	before	4.58	38	1.70	-1.41	.157
	after	4.47	38	1.81		
Grooming	before	3.45	38	1.48	-1.67	.096
	after	3.32	38	1.58		
Bathing	before	2.13	38	1.12	-1.00	.317
	after	2.05	38	1.11		
Dressing, upper body	before	2.68	38	1.53	-1.61	.107
	after	2.53	38	1.50		
Dressing, lower body	before	1.97	38	1.42	-.71	.480
	after	1.95	38	1.47		
Toileting	before	2.37	38	1.75	-.91	.361
	after	2.24	38	1.68		
Bladder management	before	2.47	38	1.70	-2.12	.034*
	after	2.32	38	1.68		
Bowel management	before	2.26	38	1.27	-1.51	.132
	after	2.13	38	1.30		
Transfers	before	3.35	37	1.84	-1.85	.064
bed/chair/wheelchair	after	3.03	37	1.77		
Transfers	before	3.16	37	1.91	-2.00	.046*
toilet	after	2.81	37	1.94		
Transfers	before	2.14	37	1.38	-.63	.527
bath/shower	after	2.08	37	1.36		
Walk	before	1.76	37	1.64	-.74	.458
	after	1.86	37	1.58		
Wheelchair	before	2.56	27	1.61	-.88	.380
	after	2.37	27	1.64		
Stairs	before	1.03	37	.16	.00	1.000
	after	1.03	37	.16		
Comprehension	before	3.73	37	1.48	-.26	.792
	after	3.70	37	1.41		
Expression	before	3.89	37	1.51	-1.00	.317
	after	3.81	37	1.51		
Social interaction	before	3.78	37	1.49	-1.13	.260
	after	3.65	37	1.48		
Problem solving	before	2.95	37	1.08	-.45	.655
	after	2.92	37	1.16		
Memory	before	3.30	37	1.68	-2.31	.021*
	after	3.05	37	1.78		
Total	before	52.57	37	19.24	-1.74	.083
	after	51.16	37	20.00		

In previous studies examining the influences of a shift toward private rooms and unit care on care workers, such a shift was shown to increase their psychological burden, resulting in a reduced quality of care for residents (Suzuki, 2005; Jang & Kuroda, 2008). In short, similar to the case of residents, care providers' adaptation to environmental

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changes and those in care service systems was also insufficient, and this may have influenced the status of excretion care, leading to a decrease in the residents' levels of independence in this activity that requires frequent daily care. The incidence of burnout among care workers increases immediately after a shift toward unit care, but it may decrease with time. In this respect, the promotion of stable and smooth operations within a short period has been reported to be effective for such workers to develop positive attitudes toward care and a sense of belonging, consequently improving the quality of care provided by them and resident-staff relationships (Jang & Kuroda, 2008; Yamaguchi, 2006). Longitudinal studies may be necessary to time-dependently examine residents' and facility staff's adaptability to environmental changes and those in care service systems, with a view to clarifying whether or not the influence of such changes on the former's excretion and memory is temporary.

V. Conclusion

In this study, we examined the changes in independence levels of old residents after the shift living environment from conventional care and shared rooms toward unit care and private rooms. On examining their FIM scores, representing their levels of ADL independence, decreases in <bladder management>, <transfers-toilet>, and <memory>-related scores were observed during the post-shift period, while there were no significant differences in the other domains. The decreased levels of independence in < bladder management >, <transfers - toilet>, and <memory> after the shift toward unit care may have reflected insufficient adaptation to changes in environments and care service systems, such as the distribution of toilets and toileting methods.

Longitudinal studies may be necessary to time-dependently examine residents' and facility staff's adaptability to environmental changes and those in care service systems, with a view to clarifying whether or not the influence of such changes on the former's excretion and memory is temporary.

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ORIGINAL ARTICLE

Encouraging Exercise Participation amongst UK South Asians:
The Case of a Community Gym

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ABSTRACT

Regular physical activity(PA) is recognised as playing a key role in promoting good health and tackling obesity. In many parts of the world there are concerns that people do not undertake sufficient PA, and that this problem is often worse for certain groups in the population. Low levels of PA amongst South Asian (SA) adults in the United Kingdom concern health policy makers and professionals because of the higher incidence of heart disease in this group than in the general population. Interventions have helped increase PA levels in white populations but have shown little success in engaging SA adults. One explanation is that interventions emphasise individual responsibility for health and pay relatively less attention to socio-cultural constraints on behaviour. Using qualitative, semi-structured interviews, we investigated influences on PA amongst 13 SA adults (aged 23-70) living in Halifax, Yorkshire, UK. The setting for our study was the participants' community gym. A key aim was to identify characteristics of the gym that influenced usage by the local SA population. We found the gym had successfully engaged SA adults in a programme of regular PA, and that a sense of its "embeddedness" in the local community was crucial to this. Implications for practice and research in health promotion and obesity prevention are discussed.

＜Key-words＞
physical activity, health-related exercise, ethnic minority, qualitative, support for exercise

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I. Introduction

1. Ethnicity, obesity and physical activity

Throughout the industrialised world there is concern that many people do not engage in sufficient physical activity (PA) to attain well-established benefits (National Institute for Health and Clinical Excellence (NIHCE), 2006a; Statistics Canada, 2002; Ham et al. 2004). The need to promote PA is therefore enshrined in national public health policies and addressed through a wide range of interventions, including in the UK (NIHCE, 2006b), Japan (Yoshiike, Kaneda & Takimoto, 2002), Latin America (Kain, Hernández Cordero, Pineda et al, 2014) and Canada (Lau, Douketis, Morrison et al, 2007). In the United Kingdom, the Chief Medical Officer (CMO) published a report, 'At Least Five a Week', which sets out the strength of evidence to support the role of PA in disease prevention and management (U.K. Department of Health, 2004a). It recommends participation in moderate intensity exercise for 30 minutes a day on at least five days a week to protect against coronary heart disease (CHD).

Internationally, many ethnic minority groups are especially likely to fall well short of recommended levels of PA, particularly those living in deprived urban settings. For example, Bryan et al. (2006) found that in Canada only 34% of South Asian and 38% of Black minorities were achieving a moderate level of PA, compared to 49% of White people. Looking at physical activity amongst Asian-Americans, Becerra, Herring, Marshak and Banta (2015) found that Korean and Japanese women were especially likely to fall below recommended levels. In the UK, South Asian adults are less likely than their white counterparts to begin or maintain a programme of exercise or to meet current PA recommendations (Williams, 2010; BHF, 2009). This is of particular concern to public health policy makers and professionals because this minority shows a higher incidence of CHD than the general population.

In the UK, Government-funded initiatives have shown some success at increasing activity levels in older adults and have helped to establish evidence to support the delivery of government targets (Carnegie Research Institute, 2007; Local Exercise Action Pilots, 2007). However, they have shown little success in engaging South Asian populations (National Institute for Health and Clinical Excellence, 2007).

2. Explaining (non) participation in physical activity

Physical Activity interventions draw primarily on health behaviour change (HBC) theory, which provides a psycho-social framework for explaining why some individuals adopt healthy behaviours whilst others do not (Dishman, 1994; Niewenhuijsen et al., 2006). HBC theories share a number of principal concepts/constructs including exercise attitude, social support for exercise and perceived behavioural control. Research provides

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some support for the predictions made by HBC theories, including the role of positive attitudes to exercise (Rhodes, et al., 1999), and of social support (Chogahara et al, 1998). Despite the widespread use of these theories as the basis for PA interventions, the approach has been subject to important critiques. These focus above all on the individualism of the HBC explanation, which emphasises the volitional nature of human behaviour. The importance of the wider socio-cultural context is not denied, but it is seen in terms of extrinsic factors that influence personal choice. This contrasts with a more thoroughly social view that sees the person and their social world as deeply intertwined (Thurston, 2004; Wray, 2007).

Limitations in the way socio-cultural influences are conceptualised may be especially important when we are considering groups such as the South Asian minority, who may have a stronger sense of community identity than is generally the case for the white majority (Johnson, 2000; Jepson et al., 2008). Studies have found a strong influence on PA behaviour among South Asian populations from wider, socio-cultural factors (Carroll et al., 2002; Snape, 2005), and resistance to schemes adopting a top-down 'w*e plan, you participate*' philosophy (Bandesha and Litva, 2005).

3. The Community Gym study

The present study focuses on users' experiences of a community gym set up in Halifax, West Yorkshire. This "Healthy Living Gym" is located in an inner city urban area with high levels of deprivation and a predominantly South Asian (largely Pakistani) population. It was founded and supported through the involvement of the West Central Halifax Healthy Living Partnership (WCHHLP), part of a national scheme. Funding for this study was provided by WCHHLP.

Research Aims

This study had two aims:

1. To explore the understandings of the relationship between PA and health amongst South Asian users of the Healthy Living Gym.
2. To identify characteristics of the Healthy Living Gym that influence the nature and extent of usage by the local South Asian population.

II. Subjects and Methods

1. Overall design

Given our emphasis on the views and experiences of participants in their social context, a qualitative approach was appropriate (Murphy et al., 1998). Data were collected using semi-structured interviews. Following consultation with the project managers, we

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developed an interview guide that was used flexibly as a framework for exploring participants' views. Ethical approval was granted by the School of Human and Health Sciences research ethics panel, University of Huddersfield.

2. Sampling and recruitment

There were two stages to our sampling process. In the first we set out to recruit a cross-section of gym users in terms of age and gender. We used information sheets distributed by gym staff, and research team members visited the gym to make personal requests. In the second stage, following some preliminary analysis and in the light of WCHHLP priorities, we focused specifically on women over the age of 50. We were provided with a list of gym members from this demographic group, and obtained the services of a locally-based community researcher who assisted in recruitment. Finally, in order to gain an overview of how the gym functioned we interviewed three members of staff. Table one provides details of participants.

<Table 1> Participant details

Pseudonym	Age	Gender	Language	Mode
Samira	38	F	English	Face to face (not recorded)
Amina	57	F	English	Face to face
Atefa	23	F	English	Face to face
Habiba	37	F	English	Face to face
Dania	23	F	English	Telephone
Labib	49	M	English	Face to face
Sardar	51	M	English	Telephone (not recorded)
Akash	51	M	English	Telephone (not recorded)
Batool	62	F	Punjabi	Face to face
Bibi	70	F	Punjabi	Face to face
Khalida	52	F	Punjabi	Face to face
Malika	61	F	Punjabi	Face to face
Bushra	52	F	Punjabi	Face to face
Hannah (staff)	37	F	English	Face to face
Munera (staff)	21	F	English	Face to face
Kashifa (staff)	37	F	English	Face to face

3. Interview procedure

Where possible, interviews were held in a quiet, private location within the building in which the gym is housed. One interview took place at the Health Centre, where the core staff for WCHHLP were based. In three cases interviews were carried out by telephone, at participants' request. Three interviews were recorded by hand with detailed notes. All others were audio-recorded and transcribed in full. All participants from the first part of the sample were interviewed in English, while all those in the second part were interviewed in Punjabi with the aid of an interpreter.

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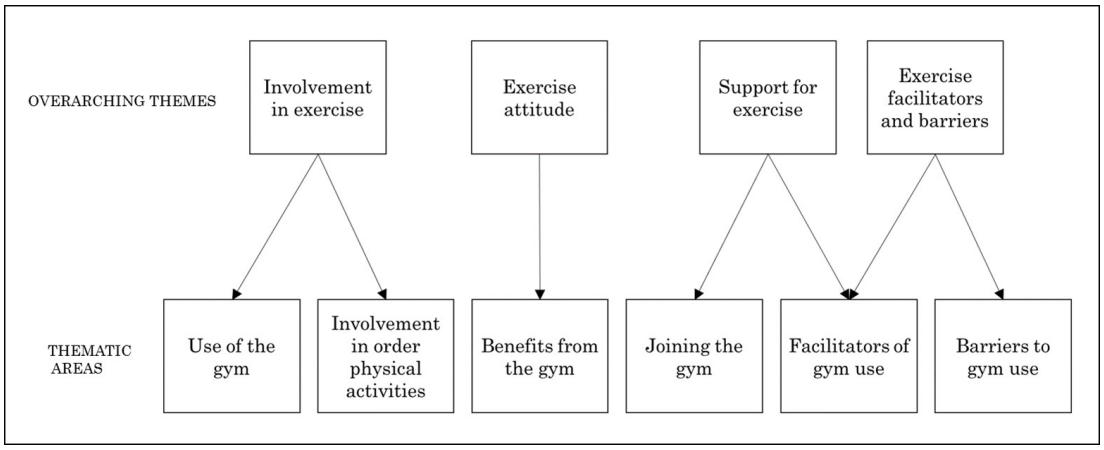
4. Data analysis

Data were analysed thematically, using a version of the matrix technique (Nadin and Cassell, 2004). In this, the main thematic areas relevant to the research aims are identified on the basis of theoretical and/or pragmatic grounds and themes from each interview summarised under each thematic area heading, usually in tabular form with thematic areas as columns and cases as rows. These case by case matrices are typically condensed to highlight patterns of commonality and difference.

In the present study, the two-stage matrix analytic process resulted in the identification of eight thematic areas, each with between two and eight sub-themes. For the purposes of the present article, we condensed the thematic areas still further to focus closely on our aims here. Figure 1 illustrates the four overarching themes covered below, and their relationship to the original thematic areas.



<Figure 1> Thematic areas and overarching themes from the analysis

Throughout the analytical process, comparisons of independent coding between the two authors and a third colleague were carried out as a quality check (Mays and Pope, 2000). Preliminary analysis was also discussed critically with a steering group including members of the WCHHLP management, Gym staff and the community researcher.

III. Results

1. Involvement in exercise

The majority of interviewees said they were not currently involved in organised exercise outside the gym. Most said their main sources of exercise outside the gym were everyday activities such as housework and above all walking. Similarly, very few had had any systematic and regular involvement in exercise prior to joining the gym.

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Regarding patterns of gym usage, most respondents said they attended the gym twice a week, and stayed for between an hour and two hours. Almost all liked to use a wide range of equipment on each visit, although many had a preference for cardiovascular machines (most commonly the treadmill) - described by Dania as machines that *"actually do something"*

2. Exercise attitude

We asked participants about the benefits they hoped to achieve as a result of joining the gym and those they had experienced through using the gym. Participants said they hoped using the gym would improve various conditions including arthritis/joint pain, diabetes, angina, back pain, high blood pressure and insomnia. Several referred to aspects of everyday physical functioning they hoped would benefit from joining the gym, such as walking and climbing the stairs. All three male participants, and the two youngest female participants (Dania and Atefa, both in their twenties) reported a desire to enhance their general levels of fitness. Anticipated psychosocial benefits were also cited as reasons for joining the gym. For example, Atefa wanted time for herself, away from child-care responsibilities:

> *Now I've just had a baby again so it's my second child so this is my time out from him. So it's more psychol*
>
> *ogical you know, my emotional and mental well-being as well as my physical (Atefa)*

All participants reported that using the gym was providing them with benefits regarding their health and well-being. Better management of, and reduced symptoms from, specific conditions were commonly reported by older participants. Khalida, for example, described improved management of her diabetes, while Labib referred to a reduction in breathlessness and lack of stamina associated with his angina:

Overall, it was the older participants in particular who believed that regular gym use had brought about welcome changes in terms of disease management and physical functioning. Most participants, particularly younger adults, described general feelings of increased overall fitness through using the gym such as having more energy and looking younger. Most also said they had lost weight. Some referred to longer-term health benefits:

> *…if you get out and about and exercise yourself you keep yourself fit you won't be buried quickly, meaning that you won't be ill and be on a bed basically" (Bibi).*

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Psychosocial benefits from using the gym were experienced by all participants. Several felt their mental health had improved and gave specific examples including relief from the stress and tension related to pressures in everyday life, improved mood, and being able to forget worries about health problems. All participants enjoyed meeting friends at the gym and in some cases making new friends too, although they varied in how important these aspects were to them.

3. Support for exercise

Participants had been encouraged to join the gym either by a health practitioner, a family member or a friend (or a combination of the three). Malika said her doctor advised her to join the gym, *"I have arthritis so my doctor say you go get exercise - little bit better – a little bit better. When you exercise you better"*. Dania's friends, who were already gym members, encouraged her to join: "*I knew quite a few people that were going to the Gym …they were saying it's quite good for you, you know."*

All participants were positive about the support they received from gym staff (most of whom lived locally and spoke the participants' own language). As well as being friendly and approachable, gym instructors assisted participants in a variety of ways including checking blood pressure, providing guidance on the use of specific exercise machines, and devising personalised exercise programmes. They also gave advice on wider aspects of health such as diet and food preparation:

> *… healthy eating as well because sometimes I tend to go eat wrong things, you know what I mean, they say 'plenty of water', you know, 'less of this less of that' you know - some good hints (Habiba)*

Most participants enjoyed meeting and interacting with other gym users. For some, particularly the older adult interviewees, this seemed to be important in increasing exercise confidence and motivation. As Labib explained, "…*doing exercise on your own, it's very difficult and when there's a few of you…it gives you more self-belief.*" Labib also said he found seeing men older than himself using the machines encouraged him to keep going. Dania said that without social interaction while using the equipment she would soon become bored:

> *It just passes the time you know. I'm one of those I'm looking at the clock all the time, but if I've got someone to talk to my time flies. So I'd rather get on with the machines if there is someone to talk to next door [i.e. on neighbouring machine]*

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Exercising together facilitated wider social support. Habiba, for instance, found that exercising with other members provided opportunities for wider support, "*…they're all quite close here as well, we share our problems and everything…and you see somebody who's got the same problem as you.*"

4. Exercise facilitators and barriers

A range of factors that facilitated or inhibited gym use emerged from our analysis. As one might expect, the location of the gym made it convenient for participants to attend. The fact that participants could walk to the gym was also useful and a necessity for most as few owned cars or were able to drive. Bibi said she could see the gym from her house and that this prompted her to attend: "*when I see the lights on, I thinks…right, it's on now, so I go across.*"

In addition to location, participants referred to other elements that facilitated their use of the gym including availability of women only sessions, timing of sessions, access to a variety of exercise equipment and being able to speak their own language. The affordability of sessions was frequently mentioned; all participants said they were happy with this aspect of the gym and particularly appreciated being able to pay per session as opposed to having to pay an annual membership fee.

Availability of women-only sessions in the morning meant that younger participants could fit exercise in with their children's schooling. The gym's proximity to the local school meant that Habiba could reach her children at short notice which she appeared to find re-assuring, "*…if I'm needed…you know – you can get there if you're needed.*" Dania liked the fact that gym sessions were available in the evening, as she could not attend during the day because she needed to look after her children who had not yet started school.

The most commonly reported barrier to exercise was lack of time due to work commitments, home and family responsibilities and social and religious obligations. Both Khalida and Malika said their work as shopkeepers kept them busy and prevented them using the gym more than twice a week. Childcare was a potential barrier to exercise for younger female participants, though this had been quite successfully addressed through the careful timetabling of sessions.

Some participants said visiting and entertaining friends and family members restricted involvement in exercise. There was a strong feeling amongst older female participants that it is customary to entertain family and friends and that reducing the amount of time and effort given to this activity in order to exercise would attract community censure:

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> *It's a lot to do with culture, when somebody comes to your house you look after them and feed them well. If you were going to come out to the gym they would say: "oh look at her, she's gone off to the gym wanting to be smart". That puts me off* (Bibi)

In terms of religious obligations, older participants in particular said they did not participate in organised exercise throughout the month of Ramadan or when they went to Hajj (pilgrimage to Mecca). However, the expectations of religion were not necessarily at odds with gym participation. Bibi said she hoped to go to Hajj later in the year and expected improvements in her general fitness from using the gym and from increased amounts of walking would help her to successfully complete the pilgrimage.

IV. Discussion

We will consider our findings in relation to the two aims of the study: how South Asian users of the Healthy Living Gym understood the relationship between PA and health, and the characteristics of the Healthy Living Gym that influenced the nature and extent of its usage.

1. Understanding of the relationship between PA and health

Some previous studies have found that South Asians were limited in the extent to which they understood and valued the health and wellbeing benefits of exercise (U.K. Department of Health, 2004b; Lawton et al., 2006). This was not the case with the Healthy Living Gym users we interviewed. They were clearly aware that regular exercise at the gym could lead to improvements in specific conditions and to enhanced general levels of fitness. Though less evident, there was at least some awareness of the longer term preventative health benefits of PA. Our participants also understood that this form of organised PA could have psychological and social benefits, and for some these were important factors in maintaining active membership of the gym.

When we consider why our participants showed this kind of understanding and valuing of exercise, we must bear in mind that they were selected as existing users of the gym. Perhaps at the point they joined they were already more receptive than others in their community to the message of the link between PA and health? The nature of our data does not enable us to directly examine this possibility, but it is worth noting that their responses regarding prior involvement in exercise do not suggest that they were unusually committed to PA before attending the Healthy Living Gym. However typical or atypical our sample was, it is clear that the involvement of gym staff was key to developing users' understanding regarding health and exercise. They used their "insider"

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status as members of the community to deliver important messages relating to health and wellbeing, while also providing friendly and practical advice and support relating to activity in the gym. Similar to findings reported in other studies, social interaction amongst users also appears to have been important in sharing understanding (Jepson et al., 2008).

2. Explaining usage of the Healthy Living Gym

Our findings suggest three broad characteristics of the Healthy Living Gym that helped to encourage its use by members of the local South Asian population. These were: the support provided to users; the cultural appropriateness of the facility; and practical matters of cost and location. Turning first to support, this was important both in encouraging people to join the gym and in motivating them to maintain regular attendance. Because the gym was part of the wider health improvement initiative of WCHHLP, it had quite a high profile amongst local family doctors (GPs) and other health professionals, who played a part in prompting some participants to try the gym in the first place. Encouragement from friends and family was also important, especially recommendations from those who were already using it.

There was a strong feeling amongst those we interviewed that support from staff was important in developing members' confidence and motivation to maintain current levels of PA. Another significant positive influence for the majority of our participants was the facilitating effect of exercising alongside others. For female participants in particular, the group setting offered opportunities for mutual support that extended beyond exercise participation. This indicates a potential for social interaction to function both as a valued benefit of and key support mechanism for exercise.

The cultural appropriateness of the Healthy Living Gym mattered to our participants, especially with regard to the provision of single-sex sessions. The fact that the gym staff came from the community and spoke the languages used there was also helpful, which is something other studies have found to important in facilitating exercise adherence amongst South Asian communities (Jepson et al., 2008; Allender, 2006). However, none of the users we interviewed suggested that cultural issues were of over-riding importance in their choice to use the Healthy Living Gym. While recognising their distinctiveness, we should be careful not to over-state how this particular ethnic minority population differs from other groups. As with any other deprived urban community, practical issues of cost and location were significant issues for them; that the gym was cheap and could be accessed on foot was as pertinent as the attention paid to cultural issues.

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3. Implications for practice and research

Our study suggests that the Healthy Living Gym was very successful in encouraging the local South Asian community to engage in regular PA, and in enhancing their understanding of the links between exercise and health and wellbeing. Alongside evidence from previous research such as that of Snape (2005), there are lessons here for others considering PA interventions for deprived urban ethnic minority populations. We would sum up the reasons for they gym's success principally in terms of its *embeddedness* in the local community. This refers to a strong sense of the gym as part of the community, staffed by local people, physically accessible and run in a way that is tailored to the lives of its users. The users themselves became advocates for the gym in the community, which is something that other schemes could actively seek to encourage.
Despite the success of the Healthy Living Gym, there remain challenges in encouraging the population it serves to improve health and wellbeing through PA. Most notably, our research showed that involvement in the gym was not (as yet) motivating participants to engage in more PA outside of it. One strategy to address this could be to attempt to use the successful "brand" of the intervention (in our case, the Healthy Living Gym) to market other activities in the community, ideally employing the familiar and trusted staff.

Regarding future research and evaluation in this area, we would make two main recommendations. First, there is the need for larger scale multi-method studies, measuring the impact of interventions on key aspects of health and wellbeing, while also using in-depth qualitative methods to make sense of the meanings associated with exercise activities in specific community contexts. Second, we would like to see longitudinal studies that can trace individual and community changes from before an intervention starts through to long-term implementation.

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ORIGINAL ARTICLE

Promoting Wellbeing:
Amylase as an Indicator of Changes in Stress Level in People with Intellectual Disabilities

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ABSTRACT

In this paper we present the results of two small scale, pilot studies which explore the use of a small hand-held monitor used for measuring the relative levels of the digestive enzyme, Amylase, in the saliva of a population of adolescent children with intellectual disabilities, who experienced a music concert. Our hypothesis was that experiencing the concert would significantly reduce the levels of stress in each individual and thus promote an increased level of wellbeing. The study also focussed on exploring the extent to which salivary amylase activity (SAA) can be measured and used as an indicator of relative changes in levels of stress and ultimately, to see the extent to which such measurements could give 'voice' to individuals with intellectual disability. In the event, our hypothesis was not supported in that participants did not display decreased levels of SAA to a level of significance. However, further analysis and triangulation of the initial results through the case notes of each individual suggested that in fact the SAA measures were accurate and that the expectation that all participants would respond in an identical fashion, had been un-realistic.

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I. Background

Stress can impact in a negative way on the overall health and wellbeing of an individual (McEwan, 2008). Authors such as Selye (1978) have described stress as the 'wear and tear' which impacts on the body with numerous studies highlighting significant links between high levels of stress and for example, cardiovascular disease (e.g. Rosmond & Bjorntorp, 2000). Some authors have even gone so far as suggest that stress, and the way the body responds to it, are the two major factors which can negatively impact on health and well-being – even amongst young people (Roemmich, Lobarinas, Joseph et al.,2009; Roemmich, Lambiase, Balantekin et al., 2014). In addition, a wide range of studies have indicated how stress levels appear to impact significantly on a number of both physical and mental conditions. Physical impacts can include accelerating the ageing process (Hawkley & Cacioppo, 2004; Vitlic, Lord & Philips, 2014); the time required for tissue to heal (Kiecolt-Glaser, Marucha, Malarkey et al., 1995) and increased susceptibility to infection as a result of a decrease in the immune system (Glaser & Kiecolt-Glaser, 2005; Vitlic, Lord & Philips, 2014). Mental impacts can include loss of motivation, lack of energy and reduced activity levels (Stults-Kolehmainen & Sinha., 2014; McArdle & Jackson, 2000), eating disorders (Het, Vocks, Wolf et al., 2015; Trottier, Wonderlich, Monson et al., 2016) and sleep quality (Kim, Chang, Hong et al., 2015; Lattova, Keckeis, Maurovich-Horvant et al., 2011).

Stress is usually recognised as incorporating two components. First, when the individual perceives what they consider to be a threat or danger and second, when the body responds to that perceived threat. Bodily responses have traditionally been categorised as 'fight or flight'; that is when the body prepares to either run from the perceived threat or to stay and confront it. Any perceived threat or fear (rational or irrational) activates the hypothalamic-pituitary-adrenocortical axis (HPA) resulting in a significant increase in the level of hormones being released into the blood stream; including cortisol, amylase and adrenaline. The effect of this increase in hormonal activity leads to an increase in heart rate and blood circulation and enables sugar and fat to be processed rapidly in case additional energy is required (Nader, Chrousos, & Kino, 2010). In this respect, physiological changes can be a more accurate measure of bodily responses to stress.

The ability to talk about changes in our emotions and to explain and discuss the relative levels of stress and wellbeing we sense, is a difficult task for anybody. However, for an individual with a severe intellectual and / or physical disability, this can be very difficult. Problems with limited levels of language and vocabulary can be a major hurdle in explaining feelings, stresses and emotions and for individuals with additional issues, such as sight loss, the codes and practices associated with facial expressions and other

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social codes are not always available. Therefore as Yamaguchi, Takeda, Onishi et al. (2006) point out, any *'communication system for children and adults with intellectual disabilities (ID) is a desirable assistive technology"* (p.30).

Research into relative stress levels has often employed observations, rating scales and self-evaluation measures in order to investigate the level of stress experienced through exposure to a perceived threatening event. However, Monroe (2008) has pointed out that even amongst the most frequently tried and tested self reported measures (see for example Brown and Harris, 1978), the chances of obtaining reliable data; "*is generously, at best, even odds*" (p.39). Therefore, the identification and use of biomarkers that respond to, and provide reasonably accurate, quantitative measures of changing stress levels are of value not only to future research but also to those involved in a wide range of health care contexts, (Robles, Shetty, Zigler et al., 2011).

Traditionally, cortisol has been used a useful biomarker in assessing relative levels of stress in individuals (Hellhammer, Wüst & Kudielka, 2009; Khalfa, Bella, Roy et al., 2003; Kirschbaum & Hellhammer, 1994; Kreutz, Bongard, Rohrmann et al., 2004). However, the relatively slow reaction time of cortisol to stressful events and the naturally occurring fluctuation of cortisol levels throughout the day create a number of additional methodological issues. As a result, more recent studies have demonstrated that increased levels of Salivary Amylase Activity (SAA) correlates equally well with both physical and mental induced stress events (Chatterton, Vogelsong, Lu et al., 1996; Ieda, Miyaoka, Kawano et al., 2012; Nater, Rohleder, Gaab et al., 2005; Natter, La Marca, Floin et al., 2006; Nater, Abbruzzese, Krebs et al., 2006; Nater, Rahleder, Schlotz et al., 2007; Nater & Rohleder, 2009; Rohleder, Nater, Wolf et al., 2004; Rohleder & Nater, 2009; Skosnik, Chatterton, Swisher et al., 2000). An additional benefit to using SAA arises from the fact that relative changes in levels of SAA can be obtained on a regular basis as the response to stress time is far less than with cortisol. Thus for example, a number of recent studies have included numerous SAA measures to be taken with very short intervals in between each individual measure (Arai, Sakakibara, Ito et al., 2008; Kato, Ohinoya, Hasegawa et al., 2011; Shimazaki, Matsuki, Yamauchi et al., 2008).

However, studies involving collecting and analysing either cortisol or amylase have tended to require additional resources, including laboratory equipment appropriate for carrying out the analysis. The analysis of the salivary amylase samples in our current study however, involved the use of a hand-held SAA monitor developed by Nipro Co. Japan (see Higashi, Mizuno & Yamaguchi, 2005; Robles, Shetty, Zigler et al., 2011; Shetty, Zigler, Robles et al., 2010; Yamaguchi, Kanemori, Kanemaru et al., 2003; 2004; Yamaguchi, Deguchi, Wakasugi et al., 2006). Salivary amylase was collected in a pre-post test design using a disposable collector strip (Nipro Co. Japan). Analysis of the sample

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was carried out immediately and in-situ using the hand held reader. Given that the participants included in the current studies had all been registered as having an intellectual disability, the research options available to the research team were limited. For example, questionnaire or interview or any tool requiring reasonable levels of comprehension or language and vocabulary where not appropriate – given the relative low levels of communication skill in our current research population. In this respect, obtaining and using changes in levels of amylase as an indicator of change in the level of stress (increase or decrease) experienced by each participant, was highly appropriate.

Previous studies have highlighted the positive effect which music can have on our emotions (Juslin & Sloboda, 2010; Kreutz, Bongard, Rohrmann et al., 2004; McKinney, Antoni, Kumar et al., 1997; Mockel, Rocker, Stork et al., 1994; Nakayama, Kikuta & Takeda, 2007). However, simply trying to investigate the preferences, tolerances and likes/dislikes which individuals may possess is a highly contentious and problematic area of study. Although we all assume we have musical preferences, these are in fact, far from stable entities and our preference for, tolerance of and like /dislike for certain musical pieces can be continuously affected by, for example, the physical location in which we hear the music (Martindale, 2007, 1990; Martindale, Locher & Petrov, 2007; Martindale & Moore, 1988); the complexity of the musical pieces (Heyduk, 1975), along with a whole range of other factors (Han, 2003). Such issues are further complicated amongst individuals with little or no communication skill. However, a range of previous studies have highlighted the effectiveness of using salivary biomarkers in order to assess the relative impact of musical experiences (Bartlett, Kaufman & Smeltekop, 1993; Edwards, Clow, Evans et al., 2001; Tsao, Gordon, Maranto et al., 1991), and therefore, in this paper, we present the initial findings from two pilot studies.

Study number one explored the use of the salivary biomarker *amylase*, both as an indicator of stress and wellbeing in adolescents with severe intellectual disabilities but the study also enabled the piloting of the hand-held SAA monitor produced by the Nipro Co. Japan. Study number two employed a post hoc analysis of case notes carried out by the key workers for each individual participant. This second study was carried out in order to enable us to triangulate and augment data from study one and to further explore any anomalies arising from the results of first study.

The beneficial effect of music on reducing levels of stress is well documented (e.g. Thoma, La Marca, Bronnimann et al., 2013). Thus, given the fact that previous studies had identified the positive impact which musical experiences can have in reducing levels of stress, our hypothesis was that the levels of SAA in participants would reduce significantly as a result of partaking in a one hour musical event.

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Therefore, the two research questions of the study were as follows:

1) To explore any relative changes in levels of SAA amongst young participants with intellectual disabilities in response to a live musical event.
2) To explore the use of the hand-held amylase monitor as a means of measuring stress levels in participants with intellectual disabilities.

Ethical permission for the research was given by the UK university. As all participants were aged under 18 years old, permission was initially sought and gained from parents. However, even where parental permission was obtained the final consent was left to each individual. Any participants who did not wish to take part at any point, was omitted from the sample.

II. Method - Study One

Our procedure involved collecting 102 measures of SAA, in a pre-post test design. All participants were adolescents enrolled in a state-run special school specifically catering for children with intellectual disabilities. Two professional musicians performed in the communal setting within the school. A small saliva sample was obtained from each participant both before and after a one hour music concert. Samples were collected using the designated spatula designed by Nipro Co. Japan, for use with the hand-held monitor. Samples were collected by a member of the school staff who was known to the participant and all saliva samples were analysed immediately. In order to prevent any emerging bias, the collection of the SAA was carried out under 'blind conditions' – that is, the individual with responsibility for the saliva collection was trained in using the monitor and in recording the results, but they were not informed as to whether or not the results they obtained were positive or negative.

The intervention took place during the afternoon school session and lasted for one hour. The timing of the event was crucial and took place between 1.30 and 2.30pm. Amylase is essentially a digestive enzyme and therefore increased levels of amylase are produced before and during meals for example. Subsequently, in addition to responding to stress, increased levels of SAA can be provoked by an expectation that food will soon be forthcoming e.g. when approaching a meal time; or the smell of food preparation throughout the institution, or any food or drink, other than water, consumed in between the pre-post event measure (see Rohleder & Nater, 2009). Therefore, the period between 1.30 and 2.30pm was critical in that this provided a window of opportunity between fixed meal times, with all on site food preparation having finished. In total, 102 SAA measures were taken; 51 pre-event measures and 51 post- event measures.

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III. Results – Study One

Our hypothesis argued that the levels of SAA in each of the participants would decrease significantly as a result of experiencing a one hour musical event. All samples were analysed immediately using the hand held SAA monitor and readings recorded in SPSS. Since amylase activity varies significantly between individuals (e.g. as a result of medication or individual physical conditions), all data levels were converted into logarithmic values using *log(x+1)* in order to transform the data (see Robles et al., 2011). Overall, our hypothesis was not supported. Of the 51 cases, 32 (62.7%) did report the expected decrease in levels of SAA but the remaining 19 cases (37.3%) reported an unexpected increase. A paired-sample t-test was conducted in order to evaluate the impact of the intervention on levels of SAA and this suggested whilst there was an overall decrease in the means of SAA [Pre test: (M=54.23, SD=34.66); Post test: (M=46.57, SD=32.03)]; statistically this did not reach a level of significance ($t(50) = 1.41$, $p=.164$ (two tailed)).

IV. Considerations and Conclusions – Study One

In terms of the first research question, the pre-post test design did provide an indication of changes in levels of SAA amongst participants. However, results suggested that whilst there was a general trend towards supporting our hypothesis, this did not reach any level of significance with almost 40% of participants showing increased levels of stress – as indicated through an increase in their levels of SAA. There could be a number of reasons for this, but the most likely would be, first, that some error occurred during the saliva collection process. For example, a slight delay occurring between the time of the collection and the time of the analysis. Second, there could be an issue of reliability and validity with the hand held monitor and third, it could be that experiencing the live musical events, or some associated factor did in fact bring about an increase in the levels of stress experienced by the individual participants.

In consideration of the above, first we accept that an error in the collection of the saliva sample is always a possibility although the research team did provide training in this technique. Second, although it is possible that the had-held monitor was prone to a lack of reliability and validity, the extensive research done in development would argue against this (see for example Higashi, Mizuno & Yamaguchi, 2005; Shetty, 2010; Yamaguchi, Kanemori, Kanemaru et al., 2003; 2004; Yamaguchi, Deguchi, Wakasugi et al., 2006). However, it is possible that some aspect of the music concert, or a related aspect of attending the concert, did create a genuine increase in the stress level

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experienced by a particular individual. If this were found to be true, this would indicate that one advantage of this simple measure of SAA could be seen as giving voice to individuals to whom other forms of communication are not necessarily possible.

In terms of our second research question, the collection of SAA was carried out quickly and in a painless and non-intrusive way by a known member of staff. Analysis was carried out quickly and all samples were disposed of immediately following the standard procedures associated with the disposal of human tissue. No adverse effects were reported with the use of the monitor and analysis of the data suggested that salivary amylase was a sufficiently sensitive measure for exposing sometimes relative minor changes in stress levels over a limited period of time. However, although the mean values of our pre-post test data suggested that overall, the musical events did promote a decrease in levels of stress, as indicated by levels of SAA, we were unable to further explain the mixed results in terms of the increase SAA in 19 participants. Accordingly, we therefore posed one further research question in order to explore the context in which the musical event took place, and to establish if some external variable could account for the increase in SAA in 19 of the participants, namely:

- To what extent can additional, contextual factors account for the changes in SAA experienced by participants ?

Our focus here was to try to establish the extent to which the level of SAA measure, as recorded by the hand held monitor was accurate by comparing the SAA reading with case notes made by staff members in which experiences, other than the musical ones, could be exerting a level of influence. In this respect, the overall research design can be explained as *'sequential explanatory'* (Creswell, 2008). That is, a sequential design in which anomalies and unexpected results from an initial data analysis are more specifically explored and 'explained' through a more qualitative approach.

V. Method – Study Two

The data used in our second study consisted of an analysis of the case notes of each individual. Case notes on individual participants were prepared by all staff members as part of their normal professional duties and all personal or identifiable information was removed prior to analysis by the research team. However, individual identities were coded enabling a match to be made between the results of the SAA sample and the case notes for each individual. Summative sheets were prepared which detailed the main positive or negatives events & experiences of the day alongside the recorded pre-post test amylase measures. This enabled a clear comparison to be made between the result of the SAA sampling (increase or decrease) and any positive / negative factors reported in the

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case notes of the individual. In each individual case, we identified instances where SAA had increased and cross referenced this with the corresponding case notes in order to identify any correlation between the increase and the noted events / experiences within the case notes. A similar task was then carried out on those instances where the SAA levels had decreased.

VI. Results – Study Two

Comparing the results of the SAA measure and the individual participant case notes enabled a more detailed account to be made of the individual participant experiences and enabled us to set the SAA measures into an overall context. Case notes were carried out as part of normal professional practice by key workers who were not aware of the purpose of the study. In this respect, key workers were not clear as to how comments could, or would add support to our hypothesis and therefore this limited the opportunities for key worker bias.

Participants with decreased levels

We accessed the case notes of a random sample of 10 (out of 32) case notes on participants who had recorded a decrease in their levels of SAA. In each case, there was evidence of situations in which the individual was affected by the music in a positive way. Comments which reported participants displaying increased levels of cooperation, positive changes in mood, smiling and making other expressions of happiness and enjoyment frequently appeared in instances where the levels of SAA were seen to decrease. For example,

<Table 1> Participant 5

Case Note comment Pre event	Case Note comment Post event	SAA – Pre event	SAA – Post event	Difference
Difficult morning–not happy to be at school. Kept moving table. Refused to work. Appeared sad.	Much more settled	173	58	Decrease of 115

<Table 2> Participant 2

Case Note comment Pre event	Case Note comment Post event	SAA – Pre event	SAA – Post event	Difference
Upset after witnessing a lunchtime incident	Calm and happy	119	33	Decrease of 86

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In all 10 cases, comments made by key workers in case notes supported the decrease in levels of SAA within each individual. That is, had case notes been seen prior to the measure of SAA, we would have predicted the decrease.

Participants with increased levels

Of the 19 cases in which participants displayed an increase in SAA, a random sample of 10 case notes were again selected. In 7 of the cases, the detailed case notes supported (i.e. could have predicted) the idea that an increase in levels of stress had taken place as a result of one aspect of the concert, or an experience taking place within the concert; suggesting that the SAA measure had in fact been accurate. The first common cause for the increase in stress related to the volume of the music. This was a feature that appeared in a number of cases, and proved to be an issue even amongst some of those who responded to the concerts with decreased stress levels. In the second category, the increase in stress appeared to be the result of some external event which either combined with the volume of the music or contributed to the level of stress.

<Table 3> Participant 4

Case Note comment Pre event	Case Note comment Post event	SAA – Pre event	SAA – Post event	Difference
Very happy – talking about his news, keen to go to the concert – looking forward to the music.	Left the hall upset during the concert due to the noise being too loud. 5 minutes outside and then returned	26	52	Increase of 26

<Table 4> Participant 7

Case Note comment Pre event	Case Note comment Post event	SAA – Pre event	SAA – Post event	Difference
Anxious about annual review meeting. Keeps asking about it. Went to concert.	Didn't enjoy a lot – could not understand the concert as much as the last one.	24	39	Increase of 15

In three instances, no issues were reported which could explain an increase in stress and in each case, participants were not able to communicate a reason verbally. Case notes in these instances tended to focus on more clinical matters.

Overall, and in all but three instances, the increase or decrease in levels of SAA were supported by the wider context recorded within the case notes giving an indication that the actual SAA measure was generally, an accurate one. Further participant 'preferences' – as evidenced by increased levels of activity, were expressed for music or songs with which participants were familiar, rather than non-familiar musical items and in addition, we also noted that a number of the participants found the 'noise' rather than the 'music'

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to be too loud. That is, the response of the other audience members was the cause of the increased stress, rather than the actual volume of the music itself.

VII. Discussion

Thus, it appears that although the pre-post test results did not produce a significant result and therefore did not support our original hypothesis, it does seem that there is limited evidence to support the notion that the levels of SAA were an accurate measure of the levels of stress in individuals; given that those instances which displayed an increased level of SAA appeared to accounted for by other external factors and could have been predicted by the case notes. However, one further question to be addressed relates to the fact that whereas some participants did arrive at the event in an already stressful condition, the musical event did have a positive effect and a decrease in SAA was reported (see e.g. participants 2 & 5 above). Conversely, others arrived in a relatively non-stressed condition and found the event to be stressful and in these cases, an increased level of stress was recorded (see participant 4 & 7). Two possible issues could account for this. First, the case notes were subjective and therefore whilst they did actually record incidents and possible indicators of experiences which could promote stress, we have no precise measure of how stressed / aroused the individual actually felt. Second, there is also a further theoretical basis which links levels of stress to our ability to process and enjoy or tolerate music.

In order to understand this further theoretical explanation for the variation in SAA levels, we first need to report briefly on the theory of arousal and liking, as proposed by Wundt (1874) and Berlyne (1971, 1974). Wundt proposed, and Berlyne adapted, an inverted 'U' curve which plots our levels of arousal against our liking or preference for a particular experience. Following Berlyne's (1971, 1974) adapted theory, individuals display a liking / preference for a musical stimuli, that creates the "optimum" level of physiological arousal. The curve predicts that if the arousal level of the music is too low (e.g. slow and quiet), then we perceive the music to be boring and we dislike it. Correspondingly, if the arousal level is too high, for example if the volume of the music is too high or the music too complex, then we are equally likely to reject or dislike it. However, within the reality of everyday life, each of us as individuals, tend not to begin an experience from the lowest point on the curve.

Daily events cause us to move in and out of different levels of arousal and therefore we also need to factor into the inverted 'U', the precise point at which we, as individuals, enter the 'U' curve. For example, if we are already highly aroused after an argument with a colleague, then we enter a particular experience at a higher point on the curve. This

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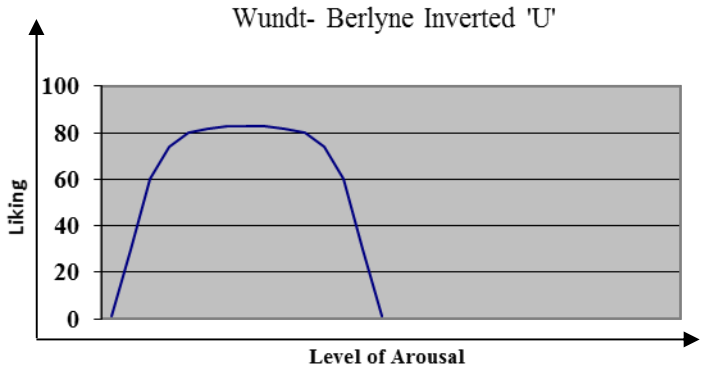
therefore affects the level and amount of additional arousal we are able to psychologically process. That is, according to the Wundt- Berlyne curve, we can process music that is far more complex and arousing when we are relaxed than when we are in a highly aroused, stressed or anxious state (see also Konečni, 1979; 1982; Konečni & Sargent-Pollock, 1976). Thus, entering into an experience from an already existing state of high arousal can impact significantly on our preference / liking for that experience.



<Figure 1> Wundt/Berlyne Inverted 'U' of Liking against Arousal (1971)

Based on this theoretical idea, we hereby suggest that the levels of stress experienced by each participant, could in fact be relatively, accurately reflected in the measures of SAA as measured by the hand-held monitor. That is, the musical event – or circumstances surrounding the context of the event, could act on the individual to reduce stress levels but also, depending on the level of arousal prior to the concert and / or the potential levels of arousal within the experience (e.g. volume, known/ unknown music, noise of the audience etc.), act to increase their apparent stress levels.

VIII. Conclusions

Therefore, we suggest that some aspects of musical experiences, or the public contexts in which they take place, can in some instances promote increased levels of stress, in the same way as they can also act positively and decrease levels of stress. In our study, some individuals were able to control this effect either through the use of additional aids such as ear defenders, or by removing themselves from the experience and returning as and when they wished to do so. By engaging in daily life, we are all subject to numerous, varied experiences and events which interact with, and impact on the level of arousal our bodies experience. Naturally, it appears that the individuals in our sample also responded effectively and normally to a plethora of additional experiences which impacted on their ability to process the musical material and in this respect, our

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hypothesis was unrealistic. In the same way that we, as individuals do not respond to our favourite piece of music in exactly the same way each time we hear it, our participants were also subject to the daily issues and impacts which engaging in society brings.

Similarly, we suggest that the information provided through the measurement of SAA can be, as Yamaguchi, Takeda, Onishi et al. (2006) stated, an effective '*communication system for children and adults with intellectual disabilities (ID)*' (p.30), in that it appears that in this relatively small sample, the levels of SAA were accurately measured – as supported to some extent by the case notes provided by key workers. If further work on a larger and broader population could be carried out, then this could contribute to our better understanding of the behaviours exhibited by individuals with little or no other means of communication. Certainly, there are many individuals living with far more complex disabilities and needs who are realistically unable to accurately express, convey or communicate their preferences, and their likes and dislikes. Those living with final stage or severe dementia for example, or those individuals living with profound, multiple learning difficulties (PMLD), could certainly benefit from an additional 'communication system' in order that those who care for them can be more effective in reducing their levels of stress and increasing their overall level of wellbeing.

In conclusion, we fully acknowledge all the limitations of this pilot study, but we suggest that the initial, and tentative results support the use of SAA as an indicator of the apparent levels of stress that individuals experience. We also suggest that this non-invasive, inexpensive, simple and ethical method provides an opportunity for all those involved in care contexts, to communicate more directly with the individuals they care for and to better understand the effect that a wide range of experiences may or may not have on the individual's physiology and overall wellbeing. This additional level of communication is of further specific importance when dealing with individuals who for a variety of reasons, cannot enjoy the benefit of directly communicating their likes and dislikes to those involved in their care. Recently, a number of authors have both argued and advocated for a more inclusive and emancipatory approach towards carrying out research with individuals who live with intellectual and physical disabilities (Cook & Inglis, 2009; Frankena, 2015; Bigby, Frawley & Ramcharan, 2014; Walmsley, 2001). In short, we argue that the use of SAA as indicator of stress can give a voice to those who otherwise have none; by allowing the physiology to speak for the individual.

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〈ex〉
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(Kim, 2005)
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(Anderson, 2001; Anderson, 2002; Miyake, Friedman, Emerson, et al., 2000)

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1) John Maynard Smith, Edward J. Feil & Noel H. Smith(2000) Population structure and evolutionary dynamics of pathogenic bacteria. *BioEssays*, 22, 1115-1122.
2) Moonjung Kim, Heajin Kwon, Changwan Han, Noriko Sasaki & Yasuyoshi Sekita (2012) A comparative study on factor analysis of the disabled employment between Japan and Korea. *Asian Journal of Human Services*, 3, 153-166.
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