A Systematic Review on Intervention Programs to Improve Activity of Daily Living Status and Health Related Quality of Life

Majed E. Al Thomali¹, Muhamad Hanafiah Juni²*, Rosliza AM², Hayati KS², Abdelsafi Abbas Mohammed Gabbad³.

¹PhD Candidate, Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
²Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
³Department of Epidemiology, College of Health Sciences, Umm Alqura University, Al-Lieth, Makkah, Saudi Arabia.

*Corresponding author: Associate Professor Dr Muhamad Hanafiah Juni
Email address: Hanafiah_juni@upm.edu.my

ABSTRACT

Background: Health related quality of life is gaining importance in examining people’s health outcomes. It is related to how good or bad people’s lives are, and to the degree of their overall wellbeing and life satisfaction level. Independency in self-care and basic activity of daily living is among the most crucial elements that could potentially affect people’s health related quality of life. The objectives of this review are to determine related studies that examined various interventions to improve the functional ability of patients with chronic diseases or injuries on health related quality of life and to identify the most common types of interventions, instruments, as well as studies designs.

Materials and Methods: Literature review was performed through an electronic search of the related studies using the words “Activity of Daily Living”, and “Intervention”. Different electronic search engines were utilized, including PubMed, Science Direct, CINHAL and Medline. A specific search criterion were applied to include scientific journal articles with experimental design, written in English language and published from 2010 to 2016. Those articles that did not measure activity of daily living and health related quality of life together using standardized measures, pilot study or still in proposal stage, were excluded.

Result: Thirty six experimental studies were eligible for inclusion. Twelve studies conducted on elderly, 7 for stroke, 6 for dementia whereas 9 studies for different kind of health conditions. Among those 36 studies, 26 studies were Randomized Control Trial design while 10 studies were quasi or other type of experimental design.

Conclusion: Randomized Control Trials was used more frequently as an experimental design. Most of the interventions were rehabilitation and physiotherapy in nature. Barthel index was identified to be the most common instrument used to measure activity of daily living, whereas SF36 and EQ5D instruments were most commonly used for health related quality of life.

Keywords: Activity of daily living, intervention studies, health related quality of life.
1.0 Introduction

Health-related quality of life (HRQOL) is gaining importance in examining people’s health outcomes. HRQOL is not limited to the number of people who have survived from injuries or diseases. It is more related to how good or bad people’s lives are, and to the degree of their overall wellbeing and life satisfaction levels (Holtslag et al., 2008). Moreover, HRQOL is an important outcomes indicator used to assess the consequence and management effectiveness of health condition problems or chronic diseases (Al-Aboudi, Hassali, Shafie, Hassan, & Alrasheedy, 2015). It has been used by healthcare provider as a measure to examine and evaluate the effect of health condition or disease, treatment, intervention or rehabilitation program on individuals with disabilities (Bishop, Chapin, & Miller, 2008).

Dependency in self-care and basic activity of daily living (ADL) such as mobility, transfer, grooming, feeding, dressing, toileting and pathing, is among the most crucial elements that could affect people’s wellbeing and HRQOL. Illnesses, chronic health conditions and injuries may lead to permanent or temporary physical disabilities that could affect functional ability and constrain independency. Therefore, affected patients may not be able to carry out their basic ADL (Undavalli, Das, Dutt, Bhoi, & Kashyap, 2014). As a consequence, HRQOL will be affected as well. Moreover, HRQOL can be best anticipated by functional activity performance of patients with chronic health conditions and traumatic injuries (Zhang et al., 2012).

Interventions that focus on ADL rehabilitation would improve the HRQOL of the injured individuals or those with chronic health conditions. In the same context, improvement of functional activities through ADL education and training could improve HRQOL as well (Haghgoo, Pazuki, Hosseini, & Rassafiani, 2013). Physical disability in performing ADL and psychological status of individuals should be taken into account when designing rehabilitation intervention to improve HRQOL (Haghgoo et al., 2013; Nätterlund & Ahlström, 2001). The intervention that encompasses in its components an emphasis of patients and family self-management will empower patient to self-manage their illnesses and improve independency in basic self-care activities. Therefore, enhance HRQOL and show better quality health outcomes (Ryan & Sawin, 2009; Johnston, Liddy, Ives, & Soto, 2008).

The objective of this systematic review is to determine related studies that examined various interventions to improve ADL for patients with chronic diseases or injuries on HRQOL, whether as a main or secondary outcome. It also, aims to identify the most common types of interventions, instruments, as well as studies designs.

2.0 Materials and Methods

A literature review was performed according to several steps through electronic searching. Different prominent electronic search engines were utilized, including PubMed, Science Direct, Medline and CINHAL. Initially, the key words “Activity of Daily Living”, and the word “Intervention” were used to generate more possible related experimental studies that introduce ADL interventions to improve HRQOL. After that, titles were read to exclude unrelated studies. Next, after identification of related studies, abstract were read thoroughly.
and duplicated studies were removed. Then, retained studies were reviewed in full text after printed out. Finally, a very specific eligibility criteria were applied to include only those scientific journal articles with experimental design, written in English language and published for the period between the beginning of January 2010 to the end of December 2016. The studies should have baseline measurement of ADL and HRQOL and at least one post intervention measurement. Those articles that did not measure ADL status and HRQOL outcomes together or measure only one of them using standardized validated measures, pilot study or studies that still in the proposal stage, were excluded. In this review, different medical conditions/diseases such as ageing, stroke, dementia, trauma and cancer were included as long as the outcomes of these diseases ended with functional disabilities and dependency to carry out ADL. Figure 1 illustrates the PRISMA chart for the articles search process.

Figure 1 PRISMA flow chart of search process
3.0 Result

In the beginning, a total of 184 studies were identified through electronic searching using the search key words. After the titles were read, the duplicated or not related studies were removed. Based on that, 139 studies were related to be included. Later, the abstracts of included studies were read thoroughly. Out of the 139 studies, 45 articles were included to be reviewed in full text after they were printed out. Finally, inclusion and exclusion criteria were applied. Among the 45 studies, only 36 articles were selected and were eligible to be included. Among those 36 studies, 26 studies were Randomised Control Trials (RCT) design while 10 studies were quasi and other type of experimental design. The results were classified based on study population health conditions. There were 12 studies conducted among elderly population, 7 studies for patients with stroke, 6 studies for patients with dementia and 11 studies conducted on different groups of population with different health conditions as represented in Table 1, Table 2, Table 3, and Table 4 respectively.
### Table 1. The results of the studies that conducted among elderly population

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Study Design</th>
<th>Study Population and Place</th>
<th>Outcome Measurement</th>
<th>Exposure Measurement &amp; Variables</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Blom et al., 2016)</td>
<td>Cluster RCT</td>
<td>11,476 elderly people with complex problems. Age &gt; 75</td>
<td>Primary: 1. HRQOL (EQ5D) &amp; Cantril’s ladder 2. ADL &amp; Instrumental ADL: Groningen Activity Restriction Scale (GARS) 3. Satisfaction Secondary: 1. Cognitive function: Mini–Mental State Examination (MMSE) 2. Geriatric Depression Scale (GDS)</td>
<td>Integrated care plan using a functional geriatric approach by general practitioner.</td>
<td>There was no difference change in HRQOL as measured by Cantril’s ladder or GARS score for ADL or IADL between participants who were randomised to have a care plan made in the intervention group and participants with complex problems in the control group. Also, there was no difference in secondary patient outcomes.</td>
</tr>
<tr>
<td>(Looman et al., 2016)</td>
<td>Quasi</td>
<td>Elders recruited from general practice. Intervention: 184 Control: 193</td>
<td>1. QOL, well-being &amp; mental health (RAND-36, EQ5D and Investigating Choice Experiments Capability ICECAP) 2. Functional ability: (Katz-15)</td>
<td>The Walcheren Integrated Care Model (WICM) intervention used as a case management approach based where participants and their caregiver assessed for their care needed, which then translated to treatment plan and activities delivered by multidisciplinary teams and coordinated by nurse practitioners.</td>
<td>WICM had a moderately positive effect on general quality of life. The general quality of life decreased in the control group but was preserved in the experimental group. No significant differences were found on functioning and functional abilities (ADL).</td>
</tr>
<tr>
<td>(Hempenius et al., 2016)</td>
<td>RCT</td>
<td>Hospitalized frail elderly cancer patients &gt; 65 years old treated with an elective surgical procedure for a solid tumour. Intervention: 127 Control: 133</td>
<td>1. Mortality 2. Re-hospitalization 3. ADL: Care Dependency Scale (CDS) 4. Use of supportive care 5. HRQOL: SF 36 6. Cognitive functioning: MMSE 7. Delirium: delirium observation scale (DOS)</td>
<td>The intervention consisted of a preoperative geriatric consultation, an individual treatment plan targeted at risk factors for delirium and daily visits by a geriatric nurse during the hospital stay.</td>
<td>There were no differences between the intervention group and usual-care group for any of the outcomes three months after discharge.</td>
</tr>
<tr>
<td>(Asmus-Szepesi et al., 2015)</td>
<td>Quasi</td>
<td>Elder patients at high risk of functional decline. One intervention hospital: 699 two control hospitals:</td>
<td>Primary outcome for patients: 1. ADL (Katz Index) 2. IADL (Lawton scale) Secondary outcomes: 1. Cognitive function (MMSE) 2. HRQOL (EQ5D &amp; SF20) 3. Geriatric depression (GDS)</td>
<td>Prevention and reactivation care program (PReCaPia) a preventive program supplementary to usual care for hospitalized elderly that has been developed and implemented in three departments (i.e., geriatrics, internal medicine, and cardiology). Hospitalized elderly offered</td>
<td>Between-hospital analysis showed no difference in (ADL) or (IADL) between PReCaP patients and control groups. Short-Form 20 showed higher perceived health 5.6 [95% CI 2.8–8.4] than control patients. HRQOL pre- and post-implementation of the PReCaP</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Place of Study</td>
<td>Usual Care</td>
<td>Intervention</td>
<td>Primary Outcome</td>
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<tr>
<td>(Tunland et al., 2015)</td>
<td>RCT</td>
<td>Norway</td>
<td>51 home dwelling old adults</td>
<td>31 intervention group</td>
<td>Self-perceived activity performance and satisfaction</td>
</tr>
<tr>
<td>(Sackley et al., 2015)</td>
<td>Non randomized intervention study</td>
<td>United Kingdom</td>
<td>50 dwelling community ≥65 years old</td>
<td>25 intervention group</td>
<td>1. HRQOL (EQ5D)</td>
</tr>
<tr>
<td>(Kjerse et al., 2014)</td>
<td>Cluster RCT</td>
<td>United Kingdom</td>
<td>Community dwelling</td>
<td>25 intervention group</td>
<td>1. Residential care placement and hospitalization</td>
</tr>
</tbody>
</table>
| (King, Parsons, 2018) | Cluster RCT | United Kingdom | 21 individuals | 21 intervention group | 1. HRQOL: SF36 | Restorative care philosophy, enhanced training and supervision for paid caregivers, | There were statistically significant differences in HRQOL (SF36) at 7 months (mean difference 3.8, 95%
<table>
<thead>
<tr>
<th>Study</th>
<th>Setting</th>
<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>Robinson, Jörgensen, 2012</td>
<td>New Zealand</td>
<td>Adults, Control = 93, Intervention = 93</td>
<td>Care management role, goal facilitation, initial in-depth assessment of older people and a support plan incorporating repetitive activities of daily living (ADL) exercises for older people designed to optimize independence. Paid caregiver contact with older people would range from daily to fortnightly, as a minimum.</td>
<td>CI (0.0 to 7.7, P = 0.05). There were no changes in other scale measurement of ADL.</td>
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<tr>
<td>Zingmark &amp; Bernspång, 2011</td>
<td>Sweden</td>
<td>74 old age individuals with difficulty in pathing, Intervention: 46, Control: 28</td>
<td>ADL: Taxonomy, HRQOL: EQ5D, Graded activity, and an encouraging approach made up 63% of all occupational therapy actions independent of type of intervention, whether it was adaptive or acquisitional. Graded activity included actions in which the therapist adjusted his/her level of support to the client and gradually altered or withdrew this support depending on the ability of the client. Encouraging approach included actions in which the therapist provided emotional support and reassurance so that the client should feel encouraged in performing different tasks.</td>
<td>At the follow-up, the self-reported ability of the clients to wash their hands and face showed a significant difference (P = 0.017). Six activities demonstrated significant improvements only in the intervention group (walking inside, walking in neighborhood, getting clothes from wardrobe, washing hair, combing hair, manicuring). At the baseline, as well as at follow-up, there was no significant difference in any of the five domains or for HRQOL between the groups. Two domains demonstrated significant improvement only in the intervention group (mobility and pain/discomfort). There was no significant improvement in the anxiety/depression domain.</td>
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<td>Kehusmaa, Autti-Rämö, Valaste, Hinkka, &amp; Rissanen, 2010</td>
<td>Finland</td>
<td>741 old age participants with progressively decreasing functional ability, Intervention: 376, Control: 365</td>
<td>HRQOL: 15D score, ADL &amp; IADL: FIM, Multidisciplinary inpatient rehabilitation introduced by physician, physiotherapist, social worker, occupational therapist) focused on physical activity, adaptation coaching to motivate the participants to adopt an active lifestyle and coping strategies for independent living, and classes on promotion of self-care, nutritional advice, discussions about mood, medical aspects, advice on social services and recreational activities. Psychological counselling also was provided. The intervention was conducted on three phases.</td>
<td>There were no significant improvement in intervention group compared to control group on ADL and HRQOL at any time point of measurement.</td>
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<tr>
<td>Kerse et al., 2010</td>
<td>New Zealand</td>
<td>193 old aged 75 years old or older with depressive symptoms</td>
<td>Multidisciplinary inpatient rehabilitation introduced by physician, physiotherapist, social worker, occupational therapist) focused on physical activity, adaptation coaching to motivate the participants to adopt an active lifestyle and coping strategies for independent living, and classes on promotion of self-care, nutritional advice, discussions about mood, medical aspects, advice on social services and recreational activities. Psychological counselling also was provided. The intervention was conducted on three phases.</td>
<td>Overall there were no differences in the impact of the two interventions on ADL and HRQOL.</td>
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</table>
Table 2: The results of the studies that conducted among stroke population

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Study Design</th>
<th>Study Population and Place</th>
<th>Outcome Measurement</th>
<th>Exposure Measurement &amp; Variables</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Shyu et al., 2010)</td>
<td>RCT</td>
<td>162 elderly patients with hip fracture</td>
<td>Clinical outcomes</td>
<td>Conducted in Taiwan</td>
<td>An interdisciplinary program of geriatric consultation, continuous rehabilitation, and discharge planning.</td>
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<tr>
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<td></td>
<td>Intervention: 80 Control: 82</td>
<td>1. Clinical outcomes 2. ADL: BI 3. HRQOL: SF36 4. Geriatric depression: GDS</td>
<td></td>
<td>Subjects in the intervention group had better performance on ADLs (β = 9.22, P &lt; .001). They had also better SF-36 physical summary scores (β = 6.08, P &lt; .001) than the control group during the first 24 months after discharge. The mental domain of SF36 didn’t show any differences.</td>
</tr>
<tr>
<td>(Sackley et al., 2015)</td>
<td>Cluster RCT</td>
<td>1042 care home residents with a history of stroke or transient ischaemic attack.</td>
<td>The main outcome: ADL (BI) Secondary outcome: 1. HRQOL EQ-5D-3L 2. Geriatric Depression(GDS)</td>
<td>Targeted three month programme of occupational therapy, delivered by qualified occupational therapists and assistants, involving patient centred goal setting, education of care home staff, and adaptations to the environment.</td>
<td>There were no significant differences between the two groups in ADL measure (Barthel Index). The adjusted mean difference in BI score at three months was 0.19 points higher in the intervention arm (95% confidence interval −0.33 to 0.70, P = 0.48). HRQOL didn’t show significant differences at all-time points.</td>
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<tr>
<td>(Ntsiea, Van Aswegen, Lord, &amp; Olorunju S, 2015)</td>
<td>RCT</td>
<td>80 post stroke survivors</td>
<td>Primary: Return to work rate Secondary: 1. ADL: (BI) 2. Mobility (Modified Rivermead Mobility index) 3. cognition 4. HRQOL: Stroke Specific QOL (SSQOL) All outcomes were measured at baseline, 3 &amp; 6 months after intervention.</td>
<td>The intervention was workplace intervention program tailored according to the functional ability and workplace challenges of each stroke survivor.</td>
<td>For every unit increase in the ADLs and cognitive assessment score, the odds of return to work increased by 1.7 and 1.3 respectively; those who returned to work had better quality of life than those who did not return to work (P = 0.05).</td>
</tr>
<tr>
<td>(Fens et al., 2014)</td>
<td>Quasi With control group</td>
<td>Patients with stroke being discharged home and their caregiver.</td>
<td>Outcome measures (T0, T6, T12 and T18) The primary outcome for patients: 1. HRQOL: Stroke-Adapted Sickness Impact Profile (SASIP-30) Secondary: Stroke care coordinator visited the stroke patients at home 1–2 weeks and 3, 6, 12 and 18 months after discharge. During each home visit the SCC administered a structured assessment tool (which we developed for the study) to assess a broad spectrum of stroke-related problems.</td>
<td>No differences were found between the groups for quality of life and the other outcome measures including ADL.</td>
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<tr>
<td>Study (Forster et al., 2013)</td>
<td>Cluster RCT</td>
<td>36 rehabilitation units</td>
<td>930 individuals with stroke and their caregivers</td>
<td>Place of study: UK</td>
<td>Primary patients' outcomes: at 12 months: Functional independence (NEADL)</td>
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<tr>
<td>Study (Kerse et al., 2010)</td>
<td>RCT 2x2</td>
<td>172 participants with stroke randomly allocated to four groups: Control: 39 DVD: 48 TCS: 46 DVD &amp; TCS: 39</td>
<td>Conducted in New Zealand</td>
<td>Primary outcome: HRQOL (SF36) at month 12 Secondary: 1. ADL (BI) 2. ADL &amp; IADL (Frenchay Activities Index) 3. Carer Strain Index 4. Modified Rankin Score</td>
<td>A DVD of four inspirational stories by Maori and Pacific people with stroke and a ‘Take Charge Session’ – a single structured risk factor and activities of daily living assessment, designed to facilitate self-directed rehabilitation.</td>
</tr>
<tr>
<td>Study (Shaw et al., 2010)</td>
<td>RCT</td>
<td>333 adults with upper limb spasticity at the shoulder, elbow, wrist or hand and reduced upper limb function due to stroke</td>
<td></td>
<td>Primary: Upper limb function: Action research arm test (ARAT) Other outcomes: 1. Upper limb impairment and activity limitation: (Modified Ashworth Scale, Motricity Index, grip strength &amp; Nine-Hole Peg</td>
<td>The intervention group received botulinum toxin type A injection(s) (DysportR) plus a 4-week programme of upper limb therapy. The control group received the upper limb therapy programme alone. Participants were clinically reassessed at 3, 6 and 9 months to determine the need for repeat botulinum toxin type A injection(s)</td>
</tr>
</tbody>
</table>
Conducted in Turkey

1. Stages of motor recovery:
2. Ambulation status:
3. Pulmonary function:
4. ADL: BI
5. Cardiopulmonary exercise test:
6. Exertional dyspnea:
7. HRQOL: SF36

All study groups participated in a conventional stroke rehabilitation programme. For the same period, the IMT and BRT groups trained daily, six times a week, with each session consisting of one half-hour of training for six weeks.

ADL and Functional Ambulation Categories scores increased significantly in the IMT group at the end of the training compared with baseline and the control group. Following training, only BI score improved significantly in the BRT group compared with the baseline.

When compared with the control group, an increase was observed in BI and Functional Ambulation Categories scores after the BRT programme, but the results were not significant statistically.

HRQOL: Physical role, general health, and vitality domains of the SF-36 improved significantly in the IMT group and emotional role, general health, pain, vitality domains in the BRT group after the training programme compared with baseline and the control group.

Table 3: The results of the studies that conducted among population with dementia

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Study Design</th>
<th>Study Population and Place</th>
<th>Outcome Measurement</th>
<th>Exposure Measurement &amp; Variables</th>
<th>Results</th>
</tr>
</thead>
</table>
| (Woods et al., 2016) | RCT | Community resident with mild to moderate dementia and their carer | Primary:
1. HRQOL: QOL Alzheimer's Disease (QOL-AD)
2. Carer psychological distress: GHQ-28
Secondary:
1. Autobiographical memory (AMI)
2. Carer patient relationship (QCPR)
3. Depression & anxiety: CSDD, HADS & RAID
4. Relative stress scale | Joint reminiscence groups emphasise active and passive reminiscence by both carers and people with dementia. Group sessions were held weekly over 12 consecutive weeks, followed by seven monthly maintenance group sessions. Each session lasted two hours and focused on a different theme, including childhood, schooldays, working life, marriage, and holidays and journeys. Dyads were encouraged to contribute with materials | There were no significant improvement or changes between groups on HRQOL; mean difference 0.07 (-1.21 to 1.35), F = 0.48, p = 0.53. ADL also showed no significant differences between intervention and control group. |
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Participants</th>
<th>Methods</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calugi et al., 2016</td>
<td>Non randomized parallel group study</td>
<td>229 Ambulatory older people with dementia. Intervention group:126 Control group: 103. Place of study: Italy</td>
<td>1.AD.L-Modified BI 2.HRQOL: SF12 3.Caregiver Strain Index (CSI) 4.Geriatric Depression Scale (GDS) 5.Risk of fractures</td>
<td>Intervention: Adaptive Physical Activity (APA) with Therapeutic Patient Education (TPE). Conducted twice a week for 16 sessions of APA and 3 of TPE. The ability to carry out ADL in control group reduced whereas improved in APA-TPE group. The physical and mental domain of HRQOL were significantly improved on both group. P value was not reported.</td>
</tr>
<tr>
<td>Chew, Chong, Tay, &amp; Fong, 2015</td>
<td>Pre post test</td>
<td>55 elders in community with mild dementia. Place of study: Singapore.</td>
<td>1.Cognitive (CMMSA) 2.ADL: BI 3.IADL: Neuropsychiatric Inventory questionnaire (NPI-Q) 4.HRQOL:EQ5D 5.Caregiver burden (ZBI)</td>
<td>Goal Attainment Setting (GAS) based rehabilitation program delivered by multidisciplinary team. HRQOL measures did not differ significantly pre- and post-intervention. BI measure also didn’t show any significant change on ADL post intervention.</td>
</tr>
<tr>
<td>Telenius, Engedal, &amp; Bergland, 2015</td>
<td>RCT</td>
<td>170 persons with dementia in nursing homes. Intervention: 87 Control: 83. Place of study: Norway</td>
<td>1.Berg Balance Scale (BBS). 2.ADL (BI) 3.Clinical Dementia Rating Scale (CDR). 4.The (NPI-Q) 5.HRQOL: QOL in Late Stage Dementia (QUALID) 6. Depression: Cornell Scale for Depression in Dementia</td>
<td>The intervention consisted of intensive strengthening and balance exercises in small groups twice a week for 12 weeks. The control condition was leisure activities. There was no significant differences between intervention and control group on ADL. HRQOL measure also didn’t show any significant differences.</td>
</tr>
<tr>
<td>Orgeta et al., 2015</td>
<td>Multi-centre single-blind, RCT</td>
<td>356 of older people with mild to moderate dementia and their caregiver. Place of study: UK.</td>
<td>Primary outcomes for patients: 1.Cognition (ADAS-Cog) 2.HRQOL: (DEMQOL) Secondary: 1.behavioural and psychological symptoms 2. ADL (Bristol ADLS) 3. Geriatric depression: (GDS) 4. Quality Carer-Patient Relationship (QCPR). The primary outcome for the family</td>
<td>The intervention was Individual Cognitive Stimulation Therapy (ICST) consisted of structured cognitive stimulation sessions for people with dementia, completed up to three times weekly over 25 weeks. Family carers were supported to deliver the sessions at home by family carer. There were no differences in HRQOL between intervention and control: mean difference –0.02, 95% CI –1.22 to 0.82; p-value = 0.97 at the 6-month follow-up. ICST seemed to improve health-related quality of life for carers only. There was no evidence also that ICST improved ADL.</td>
</tr>
</tbody>
</table>
Carers:
1. Mental/physical health (SF12)
2. HRQOL (EQ5D)
3. Depression (HADS)
4. Mood symptoms, resilience
5. Relationship quality comprised secondary:
   Costs estimated from health and social care and societal perspectives.

(Gitlin, Winter, Dennis, Hodgson, & Hauck, 2010)

RCT 237 patients with dementia and their caregivers
Place of study: US

Patients’ outcomes
1. ADL & IADL: Functional Independence Measure (FIM)
2. HRQOL: QOL Alzheimer Diseases.
3. Activity engagement: measured by a 5-item scale.
4. Agitated behavior: 16
5. Caregiver wellbeing: Perceived Change Index
6. Caregiver confidence

Care of Persons with Dementia in their Environments [COPE]: Up to 12 home or telephone contacts over 4 months by health professionals who assessed patient capabilities and deficits; obtained blood and urine samples; and trained families in home safety, simplifying tasks, and stress reduction. Control group caregivers received 3 telephone calls and educational materials.

At 4 months, compared with controls, COPE patients had less functional dependence (adjusted mean difference, 0.24; 95% CI, 0.03–0.44; P=.02; Cohen d=.21) and less dependence in ADL & IADL (adjusted mean difference, 0.32; 95% CI, 0.09–0.55; P=.007; Cohen d=.43). HRQOL didn’t show any significant differences at 4 months.

At 9 months there were no significant differences between groups in any of outcomes.

Table 4: The results of the studies that conducted among different type of population

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
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</thead>
<tbody>
<tr>
<td>(José &amp; Dal Corso, 2016)</td>
<td>RCT</td>
<td>Hospitalized adults with community acquired pneumonia</td>
<td>Primary: ADL: Glittre ADL Secondary: 1. Exercise capacity: incremental shuttle walking test (ISWT) 2. HRQOL: SF36 3. Distance walked: incremental shuttle walk test, 4. Peripheral muscle strength 5. Length of stay</td>
<td>The experimental group underwent a physical training program that included warm-up, stretching, peripheral muscle strength training and walking at a controlled speed for 15 minutes. The control group underwent a respiratory physiotherapy regimen that included percussion, vibrocompression, respiratory exercises and free walking. The intervention regimens lasted 8 days.</td>
<td>There was greater improvement in the experimental group than in the control group on the Glittre Activities of Daily Living test (mean between-group difference 39 seconds, 95% CI 20 to 59). The domain ‘physical functioning’ of the SF–36 quality of life questionnaire improved significantly more in the experimental group than in the control group (MD 14 points, 95% CI 1 to 28, Cohen’s $d = 0.48$). None of the other domains of the SF–36 showed statistically significant effects</td>
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<td>(Gonzalez Gonzalez, del Teso Rubio, Walimiento Paniagua, Criado-Alvarez, &amp; Sanchez Holgado, 2015)</td>
<td>Pretest posttest study</td>
<td>21 patients with fibromyalgia (Age 16–55 years).</td>
<td>ADL: BI IADL: Scale of Lawton &amp; Brody HRQOL: FIQ questionnaire</td>
<td>An intervention on motor skills (basic motor skills, pool exercise, outdoor exercise, restructuring, occupational performance and graded activity and intervention in ADL) was performed, combining pharmacological control of their symptoms and treatment.</td>
<td>There were statistically significant differences in pre-post intervention in ADL, IADL and HRQOL (P&lt;.05).</td>
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<td>(Faux et al., 2015)</td>
<td>RCT</td>
<td>184 RTA injured patients with (92 in each arm)</td>
<td>Main outcome: Return to work Secondary outcomes: 1.ADL: BI 2.HRQOL: 6D; SF6D 3.Pain: Experience Pain Index 4.Depression: Patient Health Questionnaire 5.Anxiety: Generalised Anxiety Disorder Questionnaire 5.Alcohol abuse: CAGE 6.PSTD: Post Traumatic Stress Disorder Screen.</td>
<td>Intervention: For those in the ERI group with a positive screen for high risk of persistent symptoms, an early assessment and intervention by a Rehabilitation Physician was offered. Those in the BEI group were sent written information and advised to see their GP.</td>
<td>There were no significant differences between the two intervention groups with regard to the primary or any secondary outcome measures including ADL and HRQOL.</td>
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<td>(Garvey, Connolly, Boland, &amp; Smith, 2015)</td>
<td>RCT</td>
<td>50 Adults participants with multi-morbidity recruited from family practice and primary care settings. Intervention: 26 Control:24 Conducted in Ireland</td>
<td>Primary: Frequency of activity participation: Frenchay Activities Index: (FAI) Secondary: 1.Self-perception 2.ADL satisfaction &amp; independence (COPM, NE-ADL) 3.Anxiety &amp; depression: HADS 4.Self-efficacy: SSE 5.Self-management support: HeiQ 6.HRQOL: EQ5D 7.Healthcare utilization 8.Individualized goals attainment: OPTIMAL is a six-week community-based programme, led by occupational therapy facilitators and focuses on problems associated with managing multi-morbidity and self-management.</td>
<td>There was a significant improvement for the intervention group compared to the control group on ADL; mean 40.73 (10.71); p = 0.02 There was also significant improvement in HRQOL; mean 50.50 (16.30); p = 0.02.</td>
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<td>Study</td>
<td>Design</td>
<td>Participants</td>
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<td>Primary Outcomes</td>
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<td>Mohammadi, Jowkar, Reza Khankeh, &amp; Fallah Tafti, (2013)</td>
<td>RCT</td>
<td>40 patients with Chronic Obstruction Pulmonary Disease (COPD)</td>
<td>Iran</td>
<td>ADL: BI HRQOL: SF12 Fatigue severity: FSS</td>
<td>The home-based rehabilitation programme consisted of three one-hour sessions of face-to-face, individual training in the intervention group. Training topics included pulmonary anatomy and physiology; the nature of COPD; causes and symptoms of the disease; pulmonary rehabilitation and medical treatment; use of inhalational drugs; diet; methods of smoking cessation; and side effects of smoking and passive smoking exposure. Patients were also taught the correct methods of walking, such as warming up, cooling down and pursed lip breathing.</td>
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<td>Lauhoff, Murphy, Doherty, &amp; Horgan, (2013)</td>
<td>Quasi-experimental study</td>
<td>23 subjects with Parkinson disease</td>
<td>Ireland</td>
<td>Primary outcomes: 1. Exercise tolerance: 6 minutes walk test (6MWT) 2. Gait efficiency: physiological cost index (PCI) Secondary: 1. Balance: berg balance scale (BBS) 2. Functional ability: time up and go (TUAG) 3. ADL and Disease severity and related disability: Unified Parkinson Disease Rating Scale (UPDRS) 4. HRQOL: Parkinson Disease PDQ39</td>
<td>The intervention consisted of 30-min cycle ergometry training (Thera Vital Basic), once weekly for 6 weeks. The treatment session consisted of a 3-min warmup period, 5-min stretching, 30-min cycle ergometry training and a 5-min cool-down period. Three physiotherapists led the intervention sessions. Participants were instructed to exercise at intensity between 60 and 80% of their maximal heart rate (HR).</td>
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<td>Schenkman et al., (2012)</td>
<td>RCT</td>
<td>121 individuals with Parkinson disease Randomized to three groups Control= 41 FBF = 39 AE = 41</td>
<td>US</td>
<td>Primary outcome: 1. Physical function performance (CS PFP) 2. Balance (ERT) 3. Walking economy Secondary outcomes: 1. Symptoms severity &amp; Parkinson Disease ADL Unified Parkinson’s Disease Rating Scale (UPDRS) 3. HRQOL (PDQ39)</td>
<td>The FBF program (individualized spinal and extremity flexibility exercises followed by group balance/functional training) was supervised by a physical therapist. The AE program (using a treadmill, bike, or elliptical trainer) was supervised by an exercise trainer. Supervision was provided 3 days per week for 4 months, and then monthly (16 months total). The control group participants exercised at home using the National Parkinson Foundation Fitness Counts program, with 1 supervised, clinic-based UPDRS ADL subscale scores showed significant differences: the FBF group performed better in than the control group at 4 months (mean difference__1.47, 95% CI_2.79 to _0.15) and 16 months (mean difference__1.95, 95% CI_3.84 to _0.08). HRQOL measure didn’t show any significant differences between groups.</td>
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<td>Study (Ref)</td>
<td>Design</td>
<td>Participants</td>
<td>Intervention</td>
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<td>Zhang et al., 2012</td>
<td>Quasi with control group</td>
<td>390 earthquake survivors who sustained fractures allocated to 3 groups: Early intervention: 226 Late Intervention: 80 Control = 84</td>
<td>ADL (BI) HRQOL (SF36) Life satisfaction</td>
<td>Institutional-based rehabilitation therapy.</td>
<td>Activities of daily living in the intervention groups were significantly improved compared with the control group (p = 0.004, p = 0.007). Health-related quality of life was higher in early intervention subjects compared with controls (p = 0.008).</td>
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<td>Khan et al., 2011</td>
<td>RCT</td>
<td>79 patients with Guillain barre syndrome Intervention: 40 Control: 39 Conducted in Australia</td>
<td>1. ADL: FIM 2. HRQOL: WHO-HRQOL 3. Anxiety &amp; Depression: DASS 4. Perceived Impact Problem Profile (PIPP) scales</td>
<td>All outcomes were measured at baseline and 12 months.</td>
<td>Intervention group received individualized higher intensity outpatient rehabilitation programme (for up to 12 weeks). The elements included individualized, achievable, time-based, functional goal-oriented MD treatment with active patient participation. The methods used, for example, included physiotherapy for strengthening, endurance and gait training; occupational therapy to improve everyday function (domestic, community tasks), driving and return to work; and clinical psychology for counselling and support as required. The control group received a less intensive home-based programme of maintenance exercises and education for self-management. Result showed reduced disability in the treatment group in post-treatment FIM domains (mobility, transfers, sphincter control and locomotion; all p &lt; 0.005). The treatment group compared with control group showed significant improvement in function (FIM scores): 68% vs 32%. There was no significant changes in HRQOL measure subscales of WHO-HRQOL.</td>
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<td>Chien, Lee, Wu, &amp; Wu, 2011</td>
<td>RCT</td>
<td>51 participants with heart failure Intervention: 24 Control: 27 Place of study: Taiwan</td>
<td>1. Hospital Anxiety and Depression Scale 2. Functional performance: six minutes’ walk test 4. ADL &amp; IADL: Groningen Activity Restriction Scale, 5. HRQOL: Minnesota Living with Heart Failure Questionnaire</td>
<td>Instruction at the interview to perform walking exercise combined with strengthening exercises of major limb muscles for at least 30 minutes per session, 3 sessions per week for 8 weeks at home. How to exercise in a safe and proper way, including self-monitoring of symptoms, level of exertion and exercise-related problems, was explained and summarized in a 1-page brochure. Subjects were asked to keep a daily activity log and were followed up by telephone every 1–2 weeks to monitor progress, provide feedback, and discuss the exercise program, adherence, and barriers to Compared with baseline, participants in the experimental group significantly improved their physical capacity (walking 15 m further in six minutes) and their quality of life (scoring 5 points better on the 105-point Minnesota questionnaire). The intervention produced significant benefits in HRQOL (by 7 points on the 105-point Minnesota score, 95% CI 1 to 12). P value was not reported.</td>
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<td>Study</td>
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<td>(Von Korff et al., 2011)</td>
<td>RCT</td>
<td>214 patients with diabetes or coronary heart disease, or both, and high blood pressure, high LDL or high depression score</td>
<td>Social role disability: Sheehan disability score, ADL: WHODAS-2, HRQOL: global quality of life rating</td>
<td>A 12 month intervention to improve depression, glycemic control, blood pressure, and lipid control by integrating a “treat to target” programme for diabetes and risk factors for coronary heart disease with collaborative care for depression. The intervention combined self-management support, monitoring of disease control, and pharmacotherapy to control depression, hyperglycemia, hypertension, and hyperlipidemia.</td>
<td>Global quality of life rating was significantly greater at six and 12 months in patients in the intervention group than among patients in the usual care group (p=0.005) with effect size of 0.39. The WHODAS-2 measure of disabilities in ADL showed a modest non-significant trend towards greater improvement in the intervention group than in the usual care control group (P=0.10).</td>
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4.0 Discussion

The studies included in this review have targeted different groups of patients/participants with various diseases and health conditions. The majority of the studies were conducted on elderly population with 12 studies as presented in Table 1, followed by 7 studies on individuals with stroke and 6 studies on dementia as seen in Table 2 and 3 respectively. Individuals with Road Traffic Accidents (RTAs) injuries, orthopaedic fractures, heart failure, pneumonia and Parkinsonism were found less frequent recruited as presented in Table 4. This provides evidence that aging, stroke, dementia and other type of chronic conditions are responsible for any decline in independency to perform basic ADL. Therefore, HRQOL has affected negatively as well.

Most of selected studies regardless of the type of participants recruited or health conditions, attempted to introduce various interventional programs aiming to empower and boost independency in self-care and usual activities for those patients with functional disabilities caused by injury or chronic disease. Additionally, they evaluated the effect of those interventions on ADL and HRQOL, either directly as the main outcome, or together with other different outcomes.

Although the interventions introduced by the studies to improve independency in performing basic ADL varied from study to another, however, they were rehabilitation, training exercises and physiotherapy sessions in nature. Some of the interventions included psychological, occupational training, environment modification and patient’s education. There were 5 studies have involved family caregivers in the measurements and in the activities of interventions that introduced such as the studies of (Woods et al., (2016), Orgeta et al., 2015, Fens et al., 2014, Forster et al., (2013) and Gitlin et al., (2010). The emphasis on the patients as a self-learner or patient-centered learning was not seen clearly in those interventions introduced to the patients on ADL, except in the studies of Khan et al. (2011) and Garvey et al. (2015). They were the only two studies that have included in their interventions an element of patient-centered care and self-management.

All the studies selected were intervention/experimental studies. Among 36 experimental studies, 26 studies were Randomized Control Trial (RCT), which usually bring out strong and validated results compared to other type of experimental studies. Although significant findings were obtained on ADL and HRQOL from non-randomized studies such as the studies of Gonzalez Gonzalez, del Teso Rubio, Waliño Paniagua, Criado-Alvarez, & Sanchez Holgado, (2015); Zhang et al., (2012), but still these findings are questionable due to the absence of randomization or control groups. There were only three studies that have obtained significant findings for ADL and HRQOL, together with a good study design, which are those by Garvey et al. (2015), Ntsiea et al. (2015) and Mohammadi et al. (2013). Otherwise, most of the interventions did not produce consistent significant effects on ADL and HRQOL. They either impacted ADL and HRQOL subdomains differently, or they affected one without the other.

With regards to the ADL instruments used, Barthel Index (BI) was the dominant instrument used in 17 studies for different diseases and types of patients. This reflects the generalizability and suitability of BI as an ADL instrument (Marvin & Zeltzer, 2017). On the other hand, 21 other studies have used different instruments such as Functional Independence Measure (FIM), GARS, Katz-15, Bristol ADL, CDS, Glittre ADL, Self- Perceived activity
Performance and Satisfaction (COPM), Time Up& GO for functional mobility, Nottingham Extended (NE-ADL), and Frenchay Activity Index (FAI). These instruments have proven their validity and reliability across numerous studies, however, they have been used less frequently compared to BI.

BI as the most common instrument used is designed as an assessment tool to measure ADL and level of functional dependency in 10 groups of personal care such as mobility, dressing, feeding and bathing (Sackley et al., 2015). Each group score ranks from 0 completely dependent to 5 or 10 fully independent based on functional status. The total score falls between 0-100. Zero score indicates disability whereas score of 100 indicates independency in performing ADL. It is used widely in literatures as it is proven valid and reliable instrument.

For HRQOL measures, the short form 36 (SF36) and Euro Quality of Life 5 Dimensions (EQ5D) were the two most common instruments used with several types of health conditions. Therefore, this reflects their relevance and validity as first two choices of measurement tools that can be employed to evaluate HRQOL before and after an intervention or treatment for many health conditions and diseases, particularly when they are used along with ADL measures (Brooke et al., 2014). In contrast, some studies have used disease-specific HRQOL measures such as QOL-AD for patients with dementia, COOP/ Wonka, SSQOL for stroke patients, Fibromyalgia Impact Questionnaire (FIQ) Questionnaire QUALD and DEMQOL for patients with dementia, WHOQOL and Stroke Adapted Sickness Impact Profile-30 (SASIP-30) or PDQ39 for patients with Parkinson’s disease.

SF36 and EQ5D are generic instruments used extensively in literatures and they have proven their validity and reliability for different health conditions. They are self-administered tools in a form of questionnaires to evaluate the HRQOL. EQ5D has five domains which are mobility, self-care, usual activities, pain / discomfort and anxiety / depression (Reenen & Oppe, 2015). EQ5D has two parts, the first part contains descriptive ordinal scores while the second part is a single measurement score ranged between 0 to 100. In the other hand, SF36 questionnaire consists of 8 domains which are vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, emotional role functioning, social role functioning and mental health. Similarly, SF36 is scored between 0-100. For both instruments, the lower score reflect poor HRQOL whereas, the high score indicate better HRQOL.

The sample sizes for the selected studies varied from study to another. The study of Kerse et al. (2014) recruited 3,893 participants as the largest sample size. On the other hand, only 21 participants were sampled in the study of Gonzalez Gonzalez, del Teso Rubio, Walinio Paniagua, Criado-Alvarez, & Sanchez Holgado, (2015), which was considered inadequate to represent the population and generate powerful results. The more adequate and large the sample size, the more valid and reliable the results obtained.

All the studies that were selected have measured ADL and HRQOL at baseline and at least one follow up measurement. Follow up measurement of outcomes could provide more comprehensive picture on effectiveness of intervention programs and used to examine whether pre intervention problem has improved or still exists (Vickers & Altman, 2001). There was no standardized time for follow up measurements. The follow up
measurement in this systematic ranged from one week post intervention to 36 weeks according to researcher available time and resources.

5.0 Conclusion and recommendation

In conclusion, Randomized Control Trials design was used more frequently than quasi and other type of experimental design. Most of the intervention were rehabilitation, functional and physiotherapy sessions in nature. Barthel index was identified to be the most common instrument used to measure activity of daily living, whereas SF36 and EQ5D were most common instruments to measure HRQOL. Traumatic injuries and chronic diseases are responsible for functional disabilities that generally constrain patients to carry out an ADL independently. Consequently, HRQOL was impacted negatively. The selected studies investigated in this review have attempted to improve ADL with various interventions. The HRQOL was improved inconsistently in subdomains of some of the studies. The more comprehensive the interventions that included broad care prospective and patient self-management, the more independence in performing daily functional ability, and the more positive the HRQOL impact.

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Declaration

The authors have no conflict of interest for declaration.

Author’s contribution

Author 1: Literature search, analysing and writing the draft, Author 2: Idea and concept, reviewing the articles and editing, Author 3: Reviewing and editing, Author 4: Reviewing and editing and Author 5: Reviewing and editing.
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