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Laughter and humour interventions for well-being in older adults: A systematic review and intervention classification

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Laughter and humour interventions for well-being in older adults: A systematic review and intervention classification

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Summary

Objectives: To assess the potential of laughter and humour interventions to increase well-being in a general population of adults aged 60 plus; and to develop a classification to compare approaches and potential benefits of different intervention types.

Design: A systematic search of Web of Science, PubMed/MEDLINE, PsychInfo, AMED, and PsychArticles used inclusive terms relating to laughter and humour interventions. A realist synthesis approach enabled heterogeneous interventions to be compared pragmatically.

Setting: Five laughter interventions, and one humour intervention, using one or more outcome related to well-being, were considered for inclusion after screening 178 primary research papers. The five laughter interventions, representing a sample of 369 participants, were retained.

Main outcome measures: Well-being related outcome measures reported in each intervention informed efficacy; Joanna Briggs Institute tools appraised design; and a realist approach enabled heterogeneous interventions to be measured on their overall potential to provide an evidence base.

Results: Well-being related measures demonstrated at least one significant positive effect in all interventions. Confounding factors inherent in the intervention types were observed. Individual participant laughter was not reported.

Conclusions: Laughter and humour interventions appear to enhance well-being. There is insufficient evidence for the potential of laughter itself to increase well-being as interventions contained a range of confounding factors and did not measure participant laughter. Interventions that isolate, track, and measure the parameters of individual laughter are recommended to build evidence for these potentially attractive and low-risk interventions. The classification proposed may guide the development of both evidence-oriented and population-appropriate intervention designs.

1. Introduction

The high prevalence of chronic disease, multi-morbidity, and psychosocial issues in older people necessitates action, including prioritising well-being according to the World Health Organisation (WHO)[1]. Well-being, defined by the WHO (Five) Well-being Index[2] to include feeling cheerful, active, relaxed, rested, and interested in life, is thought to buffer physical and mental disease[3], and benefit health maintenance in older adults[4]. Laughter is a universal sign of joy[5]. It is contagious and likely evolved prior to language to communicate and elicit mirth[6]. As the psychological and physiological effects of laughter can increase mood, optimism, energy, and cognitive function, and decrease anxiety, stress, loneliness, depression, and tension[7,8], laughter interventions are of interest.

A systematic review of interventions that elicit laughter in older adults would enable more insight into the effectiveness of using laughter to increase well-being. This review was conducted as none was found, notwithstanding Dr. Mora-Ripoll's[7] encouraging narrative review of the potential of simulated (self-induced) laughter in a range of populations. The International Prospective Register of Systematic Reviews listed three ongoing relevant reviews: 1) humour and laughter therapy for people with dementia[9]; 2) the use of humour in palliative care[10]; 3) the effects of laughter yoga on mental health[11].

Therapeutic laughter has a long history[12], however the scientific study of laughter (gelotology; *gelos* is Greek for laughter) dates to 1964 when Dr. William Fry, a humour researcher[13], founded the Institute of Gelotology at Stanford University[14]. Fry highlighted the value of humour and laughter in the aging process[15], and demonstrated the benefits of laughter on blood pressure and the cardiovascular system[16]. As evidence of the ability of laughter to reduce stress and pain, relax muscles, and benefit the cognitive and immune systems emerged[8,17], laughter therapies were legitimized and developed. Most were based on humour and comedy, for example Patch Adams' clown therapy[18].

Laughter interventions dispensing with humour (humour though universal[19] is individual[20] and hard to sustain) were popularized by Dr. Madan Kataria in India. Kataria added joke telling to his yoga classes in 1995 to harness the health benefits of laughter. When the jokes ran out he advised participants to 'laugh for no reason' [21]. The idea of 'faking' laughter as therapy was not new[22], but the scale was.

According to Kataria thousands of laughter yoga clubs exist[23] combining breathing techniques with clapping and playful exercises[21]. Laughing qigong, promoted for health in Taiwan since 1998, uses principles of Chinese medicine and emphasizes breathing and core strength[24].

Laughter is freely available, and has few contraindications[7], making interventions that elicit laughter attractive for aging populations. European demographics are predicted to catch up with Japan, where over 30% of people are aged 60 plus, by 2050[1]. This research aimed to: 1) ascertain whether laughter and humour interventions are effective in increasing well-being in a general population of older adults; 2) create a practical classification of interventions (none was found) to compare approaches and potential benefits among intervention types, and guide future intervention designs.

2. Methods

Search, appraisal, and synthesis methods were chosen for explicitness, reproducibility and to enable pragmatic comparisons[25, 26]. A Web of Science search was undertaken in September 2017 to capture an extensive range of publications in English, since 1970, linking laughter to health. This search was both general, to anchor the review within the overall literature, and targeted. Targeted searching was also undertaken in PubMed/MEDLINE, PsychINFO, AMED and PsychARTICLES between September and November 2017. A PICOS framework[26] supported targeted searching: Population (adults 60 years plus), Intervention (actively involving laughter), Comparison (control trial), Outcome (well-being), Study design (all). Results were exported into Covidence[27] to facilitate data management.

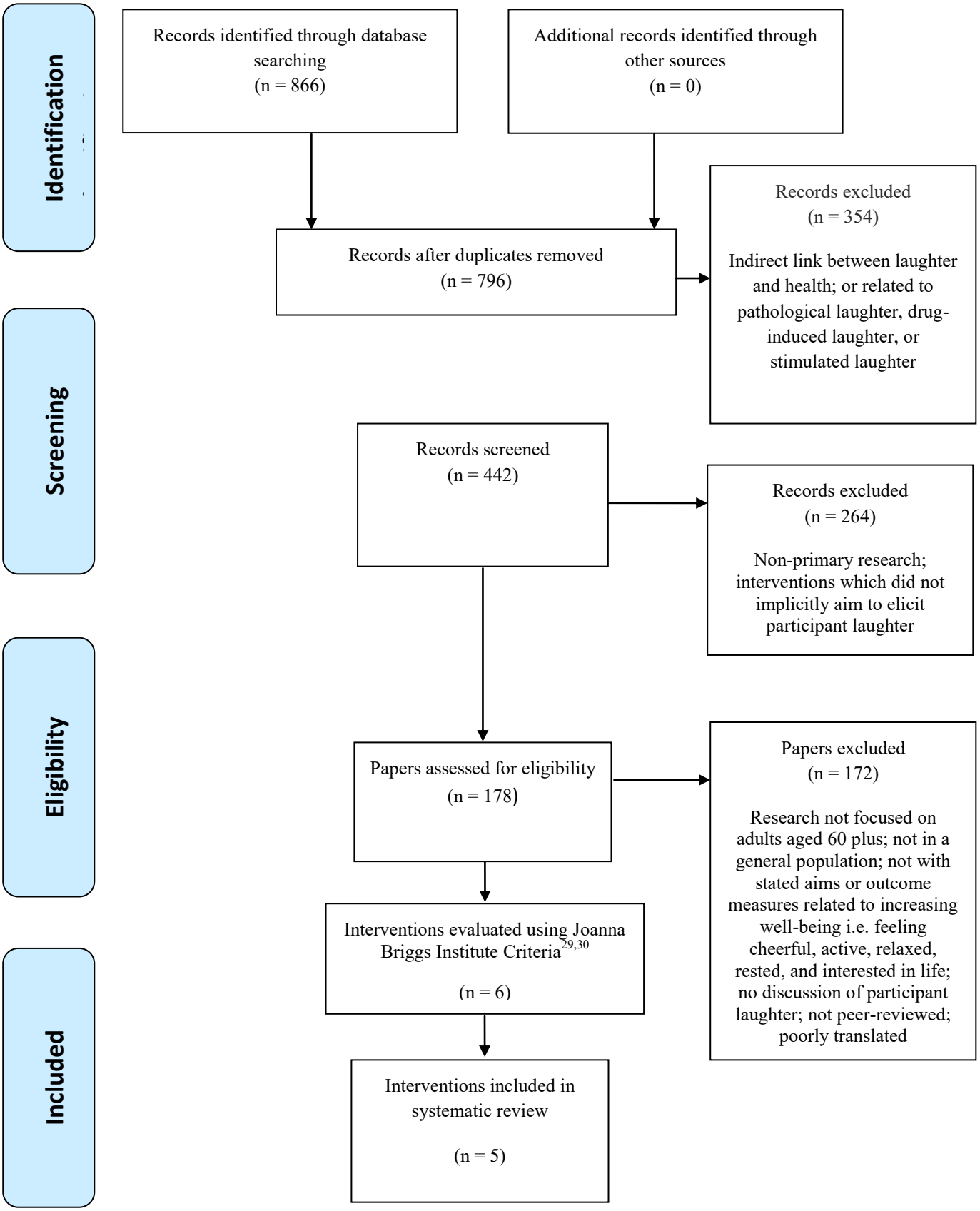
Duplicate papers were eliminated to identify 796 individual papers. The preferred reporting items for systematic reviews and meta-analyses (PRISMA)[28] flow chart (Figure 1) documents the screening process and exclusion criteria. Papers with content relating indirectly to laughter and health, and to pathological, drug-induced, and stimulated (e.g. by tickling) laughter, were excluded. The remaining 442 papers were screened to exclude non-primary research papers and interventions that did not aim to elicit participant laughter; 178 papers were retained, almost a third relating to adults aged 60 plus.

Six papers focusing on a general population (i.e. not intentionally on specific health issues), with outcome benefits relating to increasing well-being, and mentioning participant laughter, were initially retained: one randomised control trial (RCT), one randomised trial, and four using a quasi-experimental design (QED).

Data extraction was undertaken to compare the papers (Table 1 summarises the five papers retained). A classification of interventions was created to analyse intervention approaches (Figure 2). Intervention appraisal tools from the Joanna Briggs Institute[29, 30] facilitated comparisons between design types and were used to evaluate methodological quality, including data validity and potential biases. One paper, the only defined as a humour intervention[31] and including a laughter 'prescription', was eliminated as it met less than half of the QED appraisal criteria[30]. Analysis of the five papers was conducted using a realist synthesis approach[25] due to intervention heterogeneity.

Figure 1.

PRISMA Flow Chart



3. Results

3.1. Overview of interventions

Selected results, and variations in intervention design and type, are illustrated in Table 1. All interventions demonstrated statistically significant and beneficial changes in at least one outcome measure relating to well-being. Intervention types differed, and were analysed using the classification.

Table 1

Selected Details and Results of Interventions Reviewed

Authors	Location and recruitment	Intervention type and aim	Design type and duration	Sample size (control)	Participant demographics	Outcome Measures	Well-being related results
Paper 1[32] Ellis et al.	Australia Convenience: residents in care homes	Feasibility study of a laughter yoga program	Non-experimental pre-test, post-test (or quasi-experimental) 3 hours over 6 weeks (30 min. once a week)	Initial: N = 28 (0) Final: N = 28 (0)	Aged 61–96 23 women; 13 with a dementia diagnosis	Positive and Negative Affect Scale (PANAS); General Happiness Scale (GHS); enjoyment questionnaire; blood pressure	Significant positive improvements: PANAS, GHS; blood pressure lowered
Paper 2[33] Hirosaki et al.	Japan Convenience: community dwellers	Effects of a laughter and exercise program on psychological and physical health	Randomized trial 20 hours over 10 weeks (2 hours once a week incl. 50 min. watching comedy)	Initial: N = 27 (0) (14 immediate treatment, 13 delayed) Final: N = 26 (0)	Aged 60 plus 74% women; no disabilities	Geriatric Depression Scale (GDS-30); self-rated health; a range of blood measurements	Significant increases in self-rated health and correlations to GDS
Paper 3[34] Hsieh et al.	Taiwan Purposive matched groups: residents in long-term care	Effects of laughter qigong on raising mood and lowering depressive tendencies	Quasi-experimental Up to 8 hours over 4 weeks (50 min. to 1 hour twice a week)	Initial: N = 66 (33) Final: N = 62 (30)	Aged 65 plus 53% women; none suffering physical disease discomfort	Faces Scale (FS); GDS-15; salivary cortisol	Significant positive improvements in FS, GDS, and cortisol
Paper 4[35] Ko & Youn.	South Korea Convenience: community dwellers	Effects of laughter therapy on depression, sleep, cognition, and quality of life.	Randomized control trial 4 hours over 4 weeks (1 hour per week)	Initial: N = 200 (100) Final: N = 109 (61)	Aged 65 plus over 70% women; majority low socioeconomic status and no formal education	GDS-15; Short Form Health Survey (SF-36) Insomnia Severity Index (ISI); Pittsburgh Sleep Quality Index (PSQI)	Significant positive improvements: GDS, SF-36, ISI and PSQI
Paper 5[36] Song et al.	South Korea Convenience: residents in long term care	Effects of laughter therapy on negative mood and life satisfaction	Quasi-experimental 8 hours over 4 weeks (1 hour twice a week)	Initial: N = 48 (24) Final: N = 48 (24)	Aged 65 plus; 58% women	Profile of Mood States Brief; Life Satisfaction scale	Significant improvements in mood state and life satisfaction

3.2. Classification of interventions

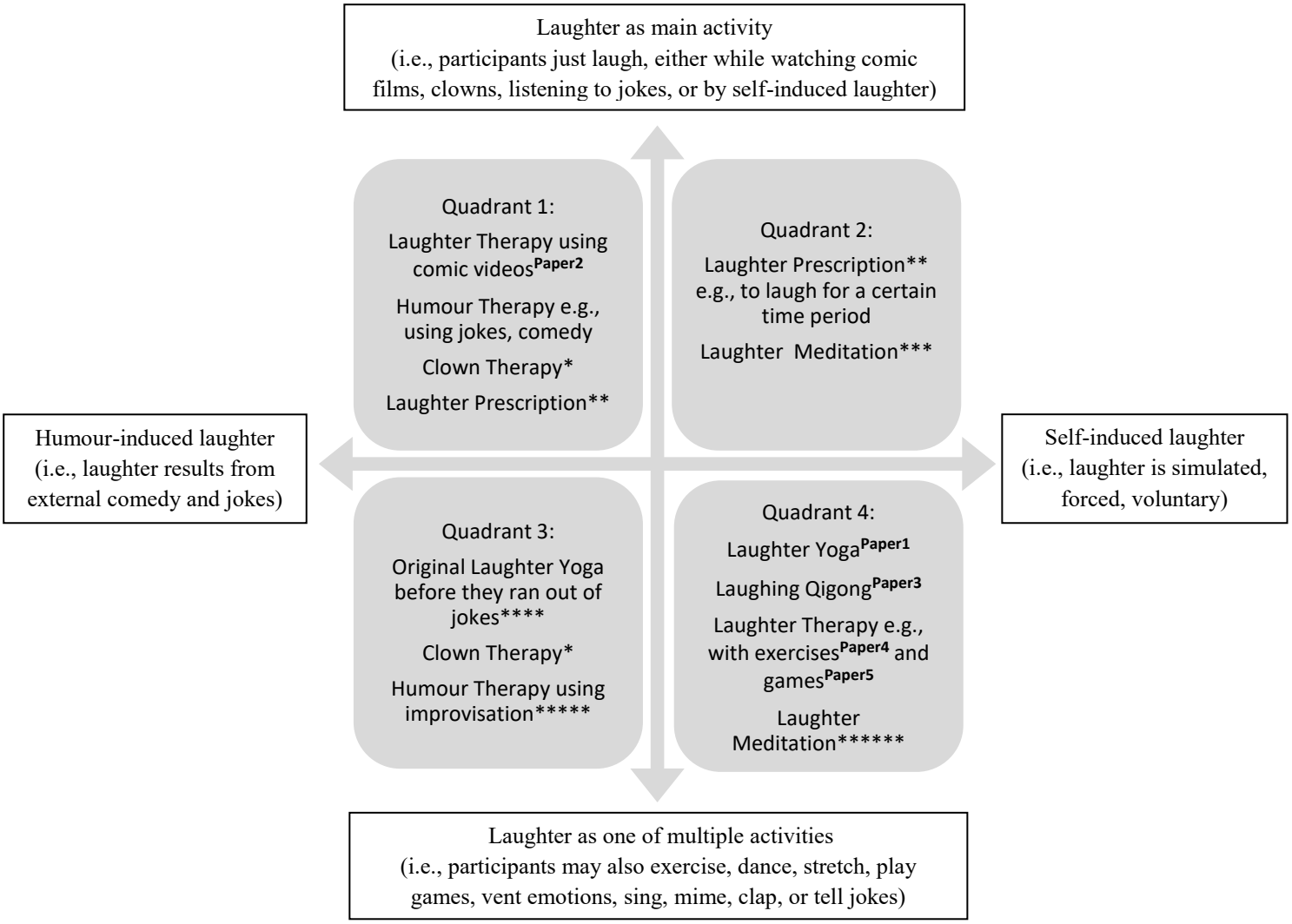
The quadrant diagram classification of laughter and humour interventions (Figure 2) facilitated comparisons. Classification differentiates intervention type and approach in 1) how laughter is induced (humour-induced versus self-induced); and 2) the participant activity content (laughter as the main activity versus laughter as one of multiple activities). Each quadrant represents a different approach. Quadrants to the left (1 and 3) use humour to elicit laughter; those to the right (2 and 4) use self-induced laughter. The top quadrants (1 and 2) use laughter as the main participant activity; the bottom quadrants (3 and 4) are 'busy' as laughter is one of multiple participant activities.

The interventions reviewed were all defined as laughter interventions: laughter yoga (Paper 1[32]), a laughter and exercise program (Paper 2[33]), laughter qigong (Paper 3[34]), and laughter therapy (Paper 4[35], and Paper 5[36]). Four interventions, classified in quadrant 4, used self-induced laughter, and were 'busy' (Paper 1[32], Paper 3[34], Paper 4[35], and Paper 5[36]). Paper 2[33] comprised two elements, one using humour-induced laughter with laughter as the main activity, classified in quadrant 1, and the second a separate exercise program; overall its approach was 'busy'.

Interventions can be hybrid, and include external non-laughter elements, as with Paper 2[33], or include, or exclude, elements from the different quadrants. Paper 1[32] did not include laughter meditation, recommended in laughter yoga interventions[21]. Paper 4[35] included laughter meditation, but that element could not be classified as the approach was not reported: laughter meditation can include stretching[37] (quadrant 4), or, just laughing as recommended in laughter yoga (quadrant 2). The humour intervention that was screened and rejected[31] included a laughter 'prescription' that also could not be classified as the approach was not reported.

Figure 2

Classification of Laughter and Humour Interventions



Note. *Clown Therapy approaches can differ[18]; **Laughter Prescriptions, e.g. as reported, but not defined, in the humour intervention[31] can use different approaches; ***Kataria's laughter meditation involves only laughter[21]; ****as recounted by Kataria[21]; ***** e.g. used as an intervention for Parkinson's[38]; ******includes stretching as defined by the Chopra Centre[37]

3.3. Result details

The majority of sample sizes were small. The 369 participants, recruited using convenience or purposive sampling, were split between experimental (212), and control (157) groups. Paper 1[32] and Paper 2[33] had no control. High attrition occurred in Paper 4[35], with 91 of 200 participant results

omitted due to 'insincere' responses. This impacted the final sample size, which was reduced to 273; 158 in the experimental, and 115 in the control groups.

The sample was split almost equally between community dwellers and those in residential care. Various sample biases were observed. Paper 1[32] included only women, half of whom had a dementia diagnosis, despite the paper not focusing on dementia. Paper 4[35] reported low socio-economic status and no formal education in the majority of participants. Paper 2[33] excluded participants with disabilities, and Paper 3[34] participants with disease-induced physical discomfort.

All five interventions appeared to use consistent and reliable outcome measures, and appropriate statistical analysis for evaluation. Measurements were taken once pre-test and post-test in all interventions, with the exception of Paper 1[32] which also measured at three points during the interventions. Paper 2[33] took a second post-test measurement. Paper 1[32] and Paper 2[33] had no control, although Paper 2[33] used a second delayed treatment group in a partial crossover design. None of the interventions recorded whether individual participants laughed.

Interventions reported beneficial changes in a range of outcome measures relating to well-being. Three used the Geriatric Depression Scale (GDS), enabling a closer comparison of results (Table 2). This showed a positive effect from baseline scores in the experimental groups (i.e. a decrease in score). In Paper 2[33] improvement was only seen in the first treatment group.

Table 2

Comparison of Geriatric Depression Scale Results

Paper	Scale	Pre-test			Post-test		
		Experimental	Treatment2	Control	Experimental	Treatment2	Control
Paper 2[33]	GDS-30	8.7	8.3	NA	7.1	8.8	NA
Paper 3[34]	GDS-15	4.91	NA	5.69	3.39	NA	6.37
Paper 4[35]	GDS-15	7.98	NA	8.08	6.94	NA	8.43

Systematic errors[39] threatening the validity of results in interventions with a control or second treatment group were partially addressed. Selection bias was addressed by randomisation (Paper 2[33], Paper 4[35]), matched treatment groups (Paper 3[34]), or being controlled for (Paper 5[36]). Attrition bias occurred in Paper 4[35] as more attrition occurred in the experimental than in the control group. Performance bias was addressed by Paper 5[36], and partially by Paper 4[35] where incomplete blinding was reported.

Funding is unlikely to have biased results. Paper 1[32] was not funded; Paper 2[33] was supported by Osaka Gas Group Welfare Foundation; Paper 3[34] was funded by the National Science Council of Taiwan; Paper 4[35] was supported by Kyungpook National University; Paper 5[36] mentions no funding.

4. Discussion

The aim of this systematic review was to ascertain whether laughter and humour interventions increased well-being in a general population of older adults. All interventions demonstrated at least one significant and beneficial well-being related outcome which was promising. Methodological limitations, mainly resulting from convenience sampling, prevented the possibility of generalising results. A range of confounding factors made cause and effect conclusions problematic. Laughter measurements were not taken, excluding an evidence-based link between laughter and well-being.

4.1. Limitations.

4.1.1. Methodological issues.

Small sample sizes, raised as a limitation by most authors, threatened the reliability of the findings. Unrepresentative samples were also an issue: women and participants with no formal education over-represented. In line with a general population of this age[1], a representative sample would include participants with at least one chronic condition; however such participants were excluded by several papers. Conversely, Paper 1[32] reported almost half of participants had a dementia diagnosis. Sample

biases likely impacted the high attrition rate in Paper 4[35]; the authors related it to low participant socio-economic status, although lack of formal education may also have been at cause.

Some flaws in intervention design threatened internal validity. Two interventions had no control. Although one of these used randomized treatment groups, posterior randomization cannot address biases resulting from convenience sampling. Apart from Paper 1[32], interventions only took pre- and post-intervention measurements, reducing the possibility of exploring outcomes. The authors of Paper 5[36] raised the need to take multiple measurements; indeed, additional measurements may have indicated that the inconsistent GDS scores observed in Paper 2[33] were an exception.

4.1.2. Confounding factors.

A variety of confounding factors existed. Had a sufficient number of papers of one type of intervention been available, these may have been reduced. Nevertheless variation within intervention type is not unusual. For instance 'gibberish', or nonsense-speak is recommended in laughter yoga to 'drain out stress' [21], and some interventions use it[41], although Paper 1[32] did not, nor did it use laughter meditation that is also often included[21].

Intervention intensity and length varied from 30 minutes per week over 6 weeks (Paper 1[32]), to 2 hours per week over 10 weeks (Paper 2[33]). All interventions took place in groups, viewed, for instance, as an important aspect in laughter yoga[21]. However, as socialising can elevate mood, participant well-being may have increased due to being with peers[40].

Interventions were 'busy' with participants taking part in a range of activities. Four papers using self-induced laughter in quadrant 4 differed in content: laughter yoga (Paper 1[32]) included a 'Tapping body laugh' and chanting, while the laughing qigong (Paper 3[34]) used stretching and the venting of negative emotions. The two laughter therapies also differed. Paper 4[35] included singing, meditating, performing Kegel pelvic muscle exercises, and shoulder massages, while Paper 5[36] used a laughing dance and various games. Fundamentally incompatible approaches were also evident: laughing qigong does not engage in 'childlike play'[34], a key component of laughter yoga[21]. The laughter element of Paper 2[33] in

quadrant 1 used humour-induced laughter which can be confounding as sense of humour varies; it also included a separate exercise element.

The exercise content in the interventions was confounding as the relationship between exercise and well-being is strong[43]. Laughter's ability to benefit body and brain chemistry, including the release of endorphins, to increase well-being and reduce stress[17,42,44], is also linked to exercise[45]. An intervention comparing laughter yoga, exercise therapy, and a control in depressed women found laughter yoga and exercise therapy to be superior to the control, but equally beneficial[41]. The authors of Paper 2[33] questioned whether the beneficial effects of their intervention were due to laughter or exercise, and raised the need to investigate the effects of laughter itself.

4.1.3. Absence of laughter evaluation.

Measurements of individual participant laughter were not reported, including whether, how often, how intensely, or for how long, each participant laughed. To be fair these interventions were not designed with this in mind, rather they provided useful insight into the positive effects of laughter interventions in group settings and discussed laugher from a group perspective.

The types of intervention used did not facilitate a direct association of outcomes to laughter. Most were situated in quadrant 4, and all were 'busy', including the intervention in quadrant 1 due to it also including a physical exercise element. An approach using laughter as the main activity may have oriented intervention measurements and outcomes to laughter itself.

It may be that laughter is not being taken seriously enough in some intervention designs focused more on good mood in general. For instance, a humour therapy RCT[46] and associated observational study[47] using 'Laughter Bosses' (elder clowns) screened for this review did not mention participant laughter.

4.2. Future research and implications.

Data validity and reliability issues observed in these interventions could be addressed by using more representative samples and strengthening intervention methodology. To build evidence for laughter interventions, it would be necessary to identify the effects of laughter itself. Interventions located in

the bottom half of the classification, including quadrant 4 where most of the interventions reviewed were located, are prone to confounding factors due to the range of activities they include. Interventions located in the top half of the classification largely avoid this. Interventions located in quadrant 2 (self-induced laughter as the main activity), may be preferable to those in quadrant 1 (humour-induced laughter as the main activity), as a humour stimulus can affect people differently.

Isolating, tracking, and measuring participant laughter could be helpful to: 1) inform an overall evidence base for the use of laughter to promote health and well-being; 2) explore relationships between laughter parameters and health benefits; 3) design suitable laughter interventions for different populations and settings. A laughter measurement tool, for instance to measure the frequency (occurrence), intensity, and duration of participant laughter, could enable data to be collected and evaluated. Although the parameters of laughter have been explored, gelotology is still in its early stages[48,49]. An easy-to-use laughter measurement tool may be useful for future research.

A qualitative approach to gather knowledge to guide the design of therapies could also be helpful. Almost half of people worldwide aged 60 plus suffer from a disability[50], and therapies designed with a focus on laughter as the main activity (in quadrants 1 and 2), may be particularly relevant. Laughter-focused data could support a more strategic approach to future applied gelotology by illuminating the most efficient ways of employing laughter in population-appropriate interventions.

5. Conclusions

Laughter interventions can have a positive effect on well-being in adults aged 60 and over. Nevertheless cause and effect inferences are inconclusive due to intervention designs containing too many confounding factors, and not being oriented to measuring laughter. Future interventions designed to isolate, track, and measure individual participant laughter may provide more conclusive data to inform an evidence base. The laughter and humour intervention classification proposed may guide future intervention designs. New and more practical interventions eliciting and measuring participant laughter, and beneficial to both participants and researchers, may support future research into the positive effects of laughter.

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