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Older Adults and The Malvik Path

Exploring Frequent and Non-Frequent Users

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Physical Activity and Health - Occupational Science

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OLDER ADULTS AND THE MALVIK PATH

EXPLORING FREQUENT AND NON-FREQUENT USERS

By: Karoline Jørstad

What do we know:

1. ^{1 in 5} will be 60 years or older by 2050. This increasing age also comes with decreasing health and activity levels.¹

2. Environments Providing green spaces which are attractive and available can promote physical activity amongst older adults?²

3. Social Contact Being able to meet and be active with familiar people is important for older adults, especially important is the support these people provide.³

4. The Malvik Path The path was implemented in 2018, and was developed using universal design. The hope of the path is to motivate and promote activity, and ensure participation and availability for all residents.⁴

Sources:

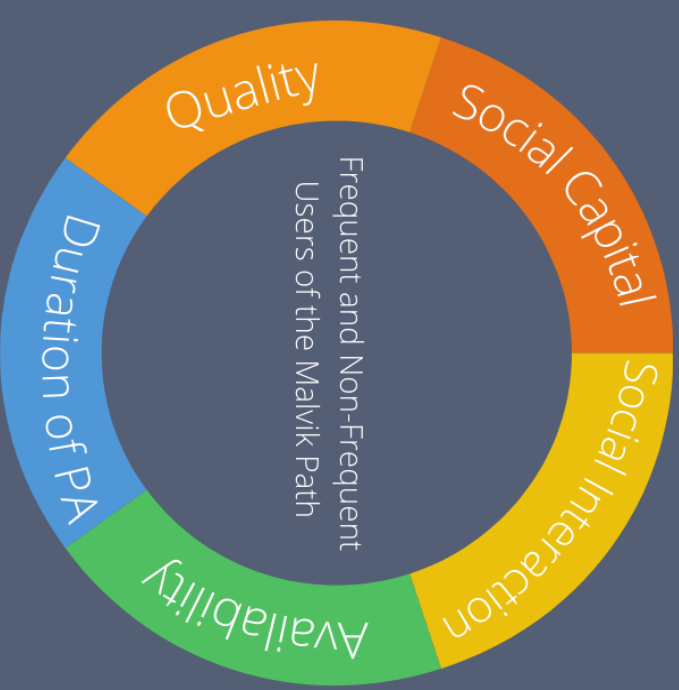
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Results:



1. The graph shows factors which was found to be significantly correlated with frequent and non-frequent users, amongst the elderly people in Malvik.

2. The results imply that personal-, contextual factors and physical activity can all contribute to the promotion of activity and health.

3. Results indicate that providing environments which ensure promotion of social and physical activities seems to be important, especially for the elderly population.

Abstract

Background: The elderly population is set to grow, and with increasing age comes higher levels of inactivity and poor health. The theory of occupation highlights the interrelationship between person, health, activity and environment: and health promotion is a strategy to approach this. In literature there are some evidence for the associations between environment and physical activity and health.

Aim: The aim of this thesis is to explore frequent and non-frequent users of the Malvik path who are 67 years and older, and look for personal-, environmental factors and physical activity, to explore (i) if any environmental factors can contribute to use of path, and (ii) if any can explain how use of path can promote health.

Method: The data used stems from a data register on residents in Malvik, and statistical analysis was conducted. The analysis consisted of descriptive-, comparative- and correlational analysis, and were performed on frequent and non-frequent users, and a set of included variables covering personal-, environmental factors and physical activity.

Result: Residents perceive the Malvik path as having good availability and quality, and they perceive high levels of social capital and social interaction. Frequent and non-frequent user of the path have significant correlations with availability, quality, social capital, social interaction and duration of physical activity. No personal factors are associated with frequent and non-frequent users.

Discussion: Results are in correlation with previous literature, and the occupational theory and health promotion approach. Results indicate that by implementing green spaces such as the Malvik path in environments, it can promote health by creating opportunities for both physical and social activities.

Sammendrag

Bakgrunn: Den eldre populasjonen vil vokse, og med økende alder kommer inaktivitet og dårligere helse. Teorien om occupation understreket viktigheten av det sammenhengende forholdet mellom person, helse, aktivitet og omgivelser: og helse promotering er en strategi for å tilnærme seg dette. I litteraturen kan man se noe bevis for sammenhengen mellom omgivelser, aktivitet of helse.

Aim: Målet med denne oppgaven er å utforske hyppige og ikke-hyppige brukere av Malvikstien, og se på personlige og omgivelsesmessige faktorer, og fysisk aktivitet, for å (i) se om omgivelsesmessige faktorer kan føre til bruk av stien, og (ii) om noen kan forklare hvordan bruk av stien kan promotere helse.

Method: Data brukt kommer fra et data register på innbyggerne i Malvik, og statistiske analysere blir gjennomført. Analysene omfattet deskriptive-, komparative og korrelasjons analyser, og ble gjennomført på hyppige og ikke-hyppige brukere og et sett med inkluderte variabler som dekker personlige og omgivelsesmessige faktorer, of fysisk aktivitet.

Resultat: innbyggerne i Malvik opplever at stien har god tilgjengelighet og kvalitet, of de har høye nivåer av sosial kapital of sosial interaksjon. Hyppige- og ikke-hyppige brukere hadde signifikante korrelasjoner med tilgjengeliggjort, kvalitet, sosial kapital, sosial interaksjon, og varighet av fysisk aktivitet. Ingen personlige faktorer hadde sammenheng med hyppige og ikke-hyppige brukere.

Diskusjon: Resultatene stemmer overens med tidligere forskning, occupational og helse promotering. Resultatene indikerer at ved å implementere grønt områder, slik som Malvikstien, så kan man promotere helse ved å skape muligheter for både fysisk og sosiale aktiviteter.

Forord

Bakgrunnen for denne masteroppgaven har vært LEV-VEL prosjektet som ble gjennomført i Malvik kommune mellom 2012 og 2018. Prosjektet jobbet med å samle et data register på innbyggerne, for å kunne undersøke deres helse, aktivitet, opplevelse av nabolag og satsningsområder (som Malvikstien). Hensikten med oppgaven har vært å undersøke den eldre befolkningen, og se på hyppige og ikke-hyppige brukere av Malvikstien, og undersøke personlige og omgivelsesmessige faktorer og fysisk aktivitet.

Prosesen rundt arbeidet med denne oppgaven har vært lang og innholdsrik. Arbeidet har bydd på ny kunnskap og forståelse, men også usikkerhet og frustrasjon. Det har vært en lang prosess med å bli sikker på sine problemstillinger, og at man faktisk bidrar til kunnskap på området. Det har vært lærerikt å kunne gjøre et dypdykk ned i et prosjekt, og kunne utforske noe som er av interesse. Jeg sitter igjen med masse ny kunnskap, og en følelse av at jeg har fått en bredere forståelse av både metode og teori.

Jeg vil gjerne takke min veileder gjennom denne prosessen, Ruca Maass. Hun har vært en av pådriverne i dette prosjektet, og har motivert til å finne spennende og sammenhengende problemstillinger, for virkelig å få utforsket nye områder av dataen. Hun har vært en god støttespiller når ting ikke har gått så greit, og man har vært både forvirret og usikker. Hun har da kommet med gode innspill som dyrker en ny forståelse, og utfordret til å tenke nytt og kritisk. Det har vært uvurderlig å kunne få innspill på progresjonen, og hun har hele veien vært opptatt av forbedringspotensialet.

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Content

Tables.....	7
1 Introduction	8
1.1 Aim	9
1.2 Theoretical Framework.....	9
1.3 Background Literature	9
2 Method	12
2.1 Sample	12
2.2 Included variables	12
2.2.1 Computed Variables	14
2.3 Statistical Analysis.....	14
2.3.1 Sample characteristics	15
2.3.2 Comparative analysis.....	15
2.3.3 Correlation	15
2.3.4 Missing values	16
2.4 Research Ethics.....	16
3 Results	17
3.1 Sample characteristics	17
3.2 Comparative analysis.....	18
3.3 Correlational analysis.....	19
4 Discussion.....	20
4.1 Environmental Factors Associated With Use	20
4.2 Social Factors Associated With Use	21
4.3 Has the Malvik Path Promoted Physical Activity?.....	21
4.4 Method	22
4.5 Limitations	23
4.6 Concluding Remarks	24
References	25

Tables

Table 1: Sample characteristics of age group 67 years and older	17
Table 2: Comparative analysis, chi-square test	18
Table 3: Comparative analysis, independent samples t-test.....	18
Table 4: Correlational analysis, correlations with "frequent and non-frequent users" ...	19

1 Introduction

The world population of elderly is set to triple within the next 30 years, resulting in 1 in 5 people being 60 years or older by 2050 [1, 2]. This ageing population does come with the issue of poor health, loss of function, and inactivity and sedentary behavior [3, 4]. Paterson, Jones [3] has summed up that sedentary lifestyles can result in chronic diseases, loss of independence and loss of function, and further decline of quality of life. Based on the risks of inactive lifestyle, studies [3, 4] have both highlighted that increasing physical activity – such as balance-mobility activities, strength exercise, and cardiorespiratory fitness – can prevent the risks of disease and loss, and rather promote benefits such as function, independence, and absence of disease. Promoting activity is thus an important part of promoting health and especially amongst the elderly.

One way of implementing the strategy is health promotion [5], which is a concept that emerged as a response to the need of address not just the behavioral determinants of health, but also the aspect of environment. It focus on a state of complete physical, mental and social well-being, where well-being is three dimensional, as it covers the physical, social and psychosocial aspects. At its core is empowerment, equity, health as a right, autonomy, and participation. In recent years it has also acknowledged that social, cultural and material environments can both damage and limit capacity to take action to promote own health, and health of the community. Thus the strategy of health promotion covers the relationship between physical activity and health, and how they can affect and be affected by each other.

The recommendations for physical activity created by World Health Organization (WHO) [2, 4], based on the age group of 64 years and older consist of at least 150 minutes of moderate-intensity- or at least 75 minutes of vigorous intensity physical activity to achieve substantial health benefits. Furthermore, health promotion is a useful strategy in doing so. However, considering the fact that so many elderly are not meeting these recommendations [6-9] there is a need to understand why. Many elderly do not necessarily define themselves as sedentary or inactive [10-14], and one reason for this is that many elderly find sedentary activities as meaningful, as they often provide an arena where they can experience social support and contact. For many elderly social activities also implement some physical activity, as they state that getting out of the house, and to the sedentary activity, for them counts as physical activity [10-14]. Thus, they do not necessarily view themselves as inactive or sedentary, as they see some physical benefits of the sedentary activities. Social support has been mentioned as an important determinant for initiation and keeping up a more active lifestyle, as they perceived this support as motivational [10-14]. Further, the studies also found that many elderly mentioned the neighborhood environment as important to reduce sedentary behavior, especially if they provide resting places and green facilities. Thus, WHO's recommendations for physical activity [2, 4] might not be enough when seeking to promote health amongst the elderly, as they also often perceive sedentary activity and social context as being active [10-14].

1.1 Aim

As the population of elderly is set to increase, and theory and literature emphasizes the relationship between person, health, activity and environment the topic for this thesis emerged. The thesis will focus on the elderly population and a use of a specific green space (Malvik path). The aim of this thesis to investigate frequent and non-frequent users of the Malvik path, in relation to personal-, environmental factors, and physical activity, and explore (i) if any environmental factors can contribute to use of the Malvik path, and (ii) if any can explain how use of the path can promote health.

1.2 Theoretical Framework

The occupations people choose will influence their lifestyles, productivity, social relationships, and indeed their health, well-being and participation in society [15]. Occupations are complex concepts that are affected by contexts, but they are a foundational aspect for participation in society. It is what we do, and who we are, and it supports people's overall sense of well-being. Communities need occupations in order to generate social capital, and individuals need community support for occupational experiences of interdependence, connectedness and resource sharing [15]. Occupations can be seen as a key factors in creating social, healthy communities where participation for all is paramount. Understanding the concept of places, and how this develops, is key in understanding how people experience occupations and how it affects when, how and with whom occupations is performed. Deprivation can often be seen as a consequence of social conditions which lead to environmental designs that fail to make occupations accessible for all residents. Within the theory of occupation seen that contextual factors, both physical and social, without a doubt influence what people do [15].

Physical characteristics can have an effect on performance and emotions tied to an occupation, but it is the social dimensions which is the most important characteristic. The places in which people find themselves to be active, strongly influence what they do, and the meaning of their time spent there [15]. This because all occupational situations are constructed by three factors: places, people and occupations they engage in. thus, the link between person, occupation and place is so strong, that occupations cannot be considered without also understanding that they involve people in places [15].

1.3 Background Literature

When seeing the evidence from what elderly people themselves point out as barriers and motivators for activity and health, what the occupational theory and health promotion says: it is evident that the aspects of person, health, activity and environment is interrelated, and need to be explored in relation to each other to get the full picture. Based on this interrelated relationship, it was of interest to see what the field has provided of knowledge and literature so far. There is a need to understand how research in the past has assessed these aspects, and how they see them in relation to each other, and to the elderly population specifically.

Looking at the group of elderly, a complex relationship between physical, environmental and psychological aspects and, how they affect participation and physical activity, can be found [16, 17]. Elderly people often seek someone to be active with, and relies on support and encouragement from family and neighbors to be physically active [6, 8, 16, 18-25]. This indicates that as elderly people perceive higher levels of support they are also more likely to be physically active. Elderly people seem to prefer environments with

high quality, and there is evidence for a positive significant relationship between perceived access to green space and use of it [7, 26]. Further the elderly seek green spaces which are perceived to be safe and pleasant [27, 28]. It has been found that people who live close to green spaces are more likely to use them, and that they also have higher chances of meeting recommendations for physical activity [17, 29], indicating that especially distance to green space is important. Thus, green spaces can be seen as an important aspect of the physical environment, as it creates opportunities for activity for the elderly.

There has been found some evidence for the association between environment, activity and health [30-33], and also between activity and psychological well-being [18, 31]. This highlights the interrelated relationship, which is further demonstrated in the review by [31], which found that green spaces can provide environmental benefits which in turn promote and improve social well-being and physical activity. Associations between green space and physical activity, as well as health, has been well established, and demonstrates that green spaces can increase both physical activity and health [28, 34-36]. However, green space and activities specific to green spaces has in some studies shown to have no significant associations [34, 37], indicating that even though green spaces are available, they are not necessarily used for activity. Amount of green space in the environment has not been found to have any association with activity [37, 38], but has been seen to have an association with health and all-cause mortality [39]. Further, less amount of green spaces in the environment has also been seen to be significantly associated with feelings of loneliness and less social support [40]. The use of green space has been seen as a predictor for neighborhood social ties and sense of community [41], indicating that with increasing use of green spaces there can also be seen an increase in these perceived social aspects.

Characteristics of green spaces, such as availability, accessibility and quality, are positively, significantly associated with physical activity [7, 17, 20, 28, 29, 35, 36, 42-45]. It means that as characteristics are perceived as being better and more pleasant, activity in general increases. Further, better characteristics of a green space can also be seen to facilitate social inclusion and social support [18, 31, 46]. This is important, as some [47] have found that low perceived social support and small social networks was associated with poor self-reported health in older adults. Social relationships has emerged as important for quality of life, as these relationships ensures that people have someone to do things with and they promote psychological well-being [22, 31]. However, some [35] have found that even though both social and physical environment influence activity, social support can be associated with pressure and peer acceptance, and as a result lead to feelings of tension and stress. These findings indicate that the social environment is of importance, especially for the elderly, in promoting activity and thus also health.

As the literature demonstrates, there can be seen positive, significant associations between green spaces and physical activity. However, it is evident that not all research separate definitions of physical activity. Most studies found have used a more general way of identifying physical activity, and has as such not looked at physical activity in the green space specifically. Only a few studies was found to assess green space specific activity, and as the literature shows, the findings are conflicting. Some found a significant association [17, 29], while others saw none [34, 37]. These contradictive findings regarding activity specific to a green space, highlights the need to investigate it more.

The literature on the elderly population shows that the social environment is important and that characteristics of physical environment is often associated with activity. These findings validates the need for further research and to explore the relationship between these aspects, especially in relation to the elderly population. This thesis will thus assess and explore whether an implementation of a universally designed green space has been successful in promoting and motivating activity, amongst, especially the elderly population. This is of interest, as implementing and developing such areas is a timely and costly manner, and it is as such important to understand whether or not they actually fulfill their purpose.

2 Method

This thesis uses data collected on residents living in Malvik. In this study the register data from the Lev-vel population survey conducted in Malvik, between 2012 and 2018, will be applied. The survey based itself on a questionnaire intending to create a register of data on the residents, covering several personal-, environmental-, behavioral-, social- and activity aspects. All analysis conducted in this thesis have been performed using IBM SPSS Statistics 26.

2.1 Sample

The sample group used in this thesis stems from Malvik, which is a municipality in Trøndelag, Norway. The residents in this municipality has participated in a health survey project, and a report on the general findings amongst all residents shed some light on the population living here [48]. The Malvik Report gives a descriptive assessment of the residents participating in 2018, and has as such seen some characterizations. Residents seem to have a high education and income, and they are likely to be married or living with a partner. Almost all perceive their neighborhood to be safe and pleasant, and report social environment factors and location as important aspects for staying there. Residents engage in social interaction with their neighbors, and many report to be pleased with both availability and quality of the neighborhood green space resources.

The Malvik path is a green space area which has been developed using inclusive planning and universal design, to ensure availability for all residents. The path consist of a 2.7km long route, and has several meeting- and resting places, and offers plaques of information on the local history along the path.

For this thesis, only those individuals who reported to be 67 years or older will be included. This means that all individuals reporting to be 66 years or younger will be removed from the data set. Only the data set from the survey distributed in 2018 will be used, as changes was made to the questionnaire between each year. These changes means that there was different premises for answering some questions for each distribution and thus the surveys from 2012 and 2014 are not valid for use in this thesis.

2.2 Included variables

Variables were included based on their relevance for this thesis aims: as they gave information on the individuals background characteristics, physical activity levels, perception of the Malvik path, use of Malvik path, social capital and social interaction. The variables which was deemed relevant will be described as what the question covered, and how the answer-categories was defined. There were some variables which had a wide range of answer-categories, and the decision was made to transform the categories to be more specific and covering. Included variables will be described.

Age – was answered by giving the current age, and thus created a range of 67 to 93. This is a continuous variable.

Gender – was answered by crossing off "male" or "female" in the question, and it was categorized and coded 1=male and 2=female, making it a categorical variable.

Frequency of physical activity – the questions asks about how often the individual is active, and this was answered on a scale, where 1=less than once a week, 2=once a week, 3=1-3 times per week, and 4=almost daily. This is thus an ordinal variable.

Duration of physical activity – the questions covers how long the individual is active for, and this was answered on a scale, where 1=less than 30min., 2=30min. to 1 hour, and 3=1 hour or more. This is an ordinal variable.

Intensity of physical activity – the questions asks about how intensive the activity is for the individual, and this was measured on a scale, where 1=takes it easy, no sweat, 2=sweaty and shortness of breath, and 3=I exert myself. This is seen as an ordinal variable.

Use of path – this variable covers use of the Malvik path, and was answered on a scale, from 1 to 5. On the category scale 1=never, and 5=very often. For the thesis, these categories were transformed into new ones, where categories 1 and 2 was coded to be "non-frequent", and 4 and 5 was coded to be "frequent". The new range was 1=non-frequent, and 2=frequent. This can now be seen as a categorical variable, and will further be presented as "frequent and non-frequent users".

Income – the questions asks for household income, and this was answered on a scale where categories were defined as; 1=400.000 or less, 2=400.001-700.000, 3=700.001-1mill., 4=1mill.-1.5mill., 5=1.5mill or more. The new, transformed categories were defined as 1="low" (category 1), 2="middle" (category 2), and 3="high" (category 3, 4, and 5). Given the defined and pre-determined categories, this was considered to be an ordinal variable.

Education – this questions asks for the individuals highest level of education, and this was answered on a scale where the range of categories was: 1="grunnskole", 2="realfag", 3="3 år vgs.", 4="less than 4 years of university", 5="4 or more years of university". These categories were transformed to be defined as 1="low" (category 1 and 2), 2="middle" (category 3), and 3="high" (category 4 and 5). This is treated as an ordinal variable.

Availability – the questions asks about the individuals perceived experience of availability of the Malvik path, and this was measured on a range of categories from 1 to 5, where categories were divided as 1=very displeased and 5=very pleased. The categories were transformed, and was divided into 1="displeased" (category 1 and 2), and 2="pleased" (category 4 and 5). This is thus treated as a categorical variable.

Quality – the questions asks about the individuals perceived experience with the quality of the Malvik path, and this was measured on a range of categories from 1 to 5, where 1=very displeased and 5=very pleased. The categories were transformed and divided into 1="displeased" (category 1 and 2), and 2="pleased" (category 4 and 5). Thus this will be treated as a categorical variable.

For the variables of use, availability and quality, the middle category of "3" was excluded in the new categories. This was done because those answering within this category are not interesting for the thesis, as they do not fit into either of the new transformed categories of interest, which is whether the individual is pleased or not, or is using the path frequent or not.

2.2.1 Computed Variables

In order to be included, some variables had to be computed to a new variable based on the existing information from other variables, and this was done so that a new variables is computed for cases where certain conditions are met.

Marital status – this was answered by crossing of the correct statement, and separated into four variables, “married/partner”, “divorced”, “widow/widower”, and “never been married”. For this thesis, these variables were computed and created the categories of 1=“married/partner” which was the same, and 2=“not married/partner” (“divorced”, “widow/widower”, and “never been married”). This makes the variable categorical.

Physical activity recommendations – this was computed based on answers given in all three questions covering physical activity (frequency, duration and intensity). To be included in the category of “follow”, the individual had to report “almost daily” (frequency), “30min. to 1 hour” or “1 hour or more” (duration) and any of the intensity categories. To be in the “do not follow” category, all other answer combinations other than the ones for “follow” was included. The new categories are thus coded 1=follow recommendations, and 2=do not follow recommendations. This is as such a categorical variable.

Social capital - this was answered in seven separate statements, covering aspects such as “I feel safe in my neighborhood”, “We have a strong sense of community here”, “Generally, people like living here”. The questions all had a range of 1 to 5, where 1=strongly agree, and 5=strongly disagree. This range was opposite of the rest of the variables, and was reversed, so 1=strongly disagree, and 5=strongly agree. Answers in these statements were summed up, and created a range, where a higher score indicate higher social capital. This is a continuous variable, with the given range of 7-35.

Social interaction – this was answered in five statements, covering questions such as “In my neighborhood it is normal for people to do things together”, “I normally stop and chat with neighbors, when I run into them”, and “I spent much time in my neighborhood, outside my own home”. These three examples were the statements used to define social interaction, as it was of interesting to see the interaction outside of the homes. They were answered on a range of 1 to 5, where 1=strongly agree, and 5=strongly disagree. This range was also reversed. Answers were summed up, and created a range, where a higher score indicate higher social interaction. This is a continuous variables, with the given range of 3-15.

2.3 Statistical Analysis

The statistical analysis was conducted in order to explore the relationship between included variables: though description, comparing and checking for correlations. The sample characteristics for the chosen age group (67 years and older) was conducted through a descriptive analysis. Frequent and non-frequent users, and the categorical variables, will be checked for associations using a chi-square test. For differences between frequent and non-frequent users in the continuous variables, a two-sided independent samples t-test was performed. Correlations was explored using a Pearson’s, partial correlation, where all variables were entered at one step. All statistical analyses have an accepted significance level of 5%.

The statistical analysis chosen does have some assumptions that need to be met, and the most important ones was in regard to linear relationship and approximately normal distribution. The first step was to produce scatterplots. This was done to check for possible clustering, and to check for how the data behaved in regard to being categorical or continuous. Further, by adding a linear line it was also possible to check the variables for linear relationships. The data was also check for possible outliers and for normal distribution. This was done through using graphs (Q-Q-plot and histograms). The data can through these graphs be seen to have some outliers, but these do not seem to affect the approximately normal distribution and linearity. Thus, the outliers has been included in all analysis, as they do consist of important information. All variables passes the assumptions for statistical analysis.

2.3.1 Sample characteristics

A descriptive analysis will be performed on the age group chosen (67 years or older) and results will be presented in a table. All included variables will be used, and categorical variables will be presented as frequency and proportion, and the continuous variables will be presented with mean, standard deviation and range. The way the variables are presented in this sample, as either categorical or continuous, is the way they will be treated in all further analysis conducted. The characteristic will give a descriptive distribution of the age group, and further some indication as to which variables are important and stand out.

2.3.2 Comparative analysis

Comparative analysis will be performed to explore possible significant differences and associations. In these analysis all included variables will be explored in relation to frequent users and non-frequent users.

The categorical variables of gender, marital status, availability, quality, income, education, frequency- duration- and intensity of PA, as well as recommendations for physical activity will be explored for possible significant association with frequent and non-frequent users, using a chi-square test. The results from these analysis will also be presented in a table, which will include frequency and proportion of one variable-category as it is distributed in the groups of "frequent" and "non-frequent" users, p-value and degrees of freedom from the test statistics.

The continuous variables of age, social capital and social interaction will be explored for possible significant difference using two-sided independent samples t-tests. The categories of "frequent" and "non-frequent" users will be the defining grouping variables. The results from these analyses will be presented in a table including mean, range, mean difference and confidence interval. Confidence interval was chosen as it provides information on the range in which the true value lies, as well as direction and strength of the effect.

2.3.3 Correlation

The correlational analysis was performed using the Pearson's partial correlation. This analysis consist of all included variables, entered at the one step to check for possible inter-relations between all included variables. The main focus for the correlational analysis was to explore possible significant correlations with the aspect of frequent and non-frequent users, and all correlations with this will be presented in a table. It is also of

interest to see if there are significant correlations between any other variables as well, and these will be explained if they prove to have a significant correlation.

2.3.4 Missing values

For the statistical analysis, missing values needed to be addressed. For all analysis performed there has been a strict line of which values are to be used. This meant that in a case needed to provide a value in both items checked in the analysis in order to be included. With this approach to missing values, they will affect the sample sizes, and thus also the statistical power. Statistical analysis on small samples can thus create uncertain results and they need to be interpreted with caution and the level of missing values in mind.

2.4 Research Ethics

The register from which the data was derived, has been approved by the Regional Ethics Committee (REK). This thesis was approved by The Norwegian Social Science Data Service (NSD) before starting the work. Participations in the survey did consent that their data would be stored in the register, and used for subsequent studies.

The original survey would have had some ethical aspects to be covered and discussed. By distributing a questionnaire like this, it can lead the respondent to feeling bad over the level of activity or social contact they have. It can also not guarantee that all answers are completely truthful, as it can lead some who feel they are not doing enough, and being self-conscious of this, to over-report and over-state theory health, activity and social contacts. This can have some implications for this thesis, and be somewhat of a risk, because the present study has to trust that people have been honest and truthful in their reporting. If people have over- or under-reported any information, this can lead to the thesis providing indication on results which are not completely true, and as such over-state the importance or lack of something.

For the results of the analysis conducted, the ethical aspect has been in the way to report them. It has been of importance to objectively and nuanced present the results, to ensure that the reader gets all the facts, and that no evidence is withheld. It has been of importance to report all results, regardless of their significance or indications.

3 Results

The objective for this thesis was to explore the frequent and non-frequent users of the Malvik path who are 67 years and older and look at personal and environmental factors, and physical activity. Results from statistical analysis will be presented, and explained. An accepted significant level of 5% was used for all analysis.

3.1 Sample characteristics

The results of the descriptive sample characteristics can be seen in Table 1.

Table 1: Sample characteristics of age group 67 years and older

	PROPORTION (%)	FREQUENCY (N)		
USE (N=134)				
Frequent	56.7	76		
Non-Frequent	43.3	58		
GENDER (N=291)				
Women	48.1	140		
Men	51.9	151		
INCOME (N=288)				
Low	18.4	53		
Middle	72.6	209		
High	9.0	26		
EDUCATION (N=278)				
Low	50.7	141		
Middle	6.5	18		
High	42.8	119		
MARITAL STATUS (N=290)				
Married/partner	79.0	229		
Not married/partner	21.0	61		
FREQUENCY OF PA (N=219)				
Less than once a week	7.3	16		
Once a week	5.9	13		
1-3 times per week	50.7	111		
Almost daily	36.1	79		
DURATION OF PA (N=210)				
Less than 30min.	7.1	15		
30min. to 1 hour	57.6	121		
More than 1 hour	35.2	74		
INTENSITY OF PA (N=202)				
Takes it easy, no sweating	41.1	83		
Sweating and shortness of breath	55.0	111		
Almost max capacity	4.0	8		
RECOMMENDATIONS FOR PA (N=209)				
Follow recommendations	34.9	73		
Do not follow recommendations	65.1	136		
AVAILABILITY (N=223)				
Displeased	10.9	22		
Pleased	89.1	179		
QUALITY (N=206)				
Displeased	6.4	12		
Pleased	93.6	175		
	Mean (SD)	Range		
		Lower	Upper	
AGE (N=291)	72.48 (4.65)	67	93	
SOCIAL CAPITAL (N=228)	28.09 (4.23)	7	35	
SOCIAL INTERACTION (N=235)	11.36 (2.01)	3	15	

PA=physical activity, SD=standard deviation

As seen in Table 1, mean age of the sample is 72.48 (SD=4.65) years old. They are most likely to be married, and 48.1% are women. As their socio-economic status, 72.6% are in the "middle"-level of income, and 50.7% have a "low"-education. As for use of the Malvik path, 56.7% are frequent users. It is noticeable that only 134 out of all respondents (n=291) have provided an answer that states either "frequent" or "non-frequent" use. The majority of responders in the age group are pleased with both availability and quality of the Malvik path. Within the aspect of physical activity, the group are likely to be active 1-3 times per week (50.7%), they will likely be active for 30 minutes to 1 hour (57.6%), and get sweaty and experience shortness of breath when active (55.0%). Only 34.9% of this age group follow recommendations for physical activity. As for the average level of social capital and social interaction this is 28.09 [7-35], and 11.36 [3-15], respectfully.

3.2 Comparative analysis

The comparative analysis have been performed as chi-square tests for categorical variables to look for associations, and two-sided independent samples t-test for the continuous variables to check for differences. The results from the comparative analysis can be seen in Table 2 and Table 3.

Table 2: Comparative analysis, chi-square test

	Frequent users		Non-frequent users		Chi-square statistics	
	N	%	N	%	Asymp. Sig. (2-tailed)	df
Gender (women)	39	51.3	22	37.9	.123	1
Marital Status (married/partner)	63	82.9	45	77.6	.441	1
Income (middle)	60	78.9	39	67.2	.261	2
Education (high)	29	38.2	32	55.2	.136	2
Frequency PA (almost daily)	30	40.5	18	32.1	.429	3
Duration PA (more than 1 hour)	34	47.2	13	25.0	.002**	2
Intensity PA (takes it easy)	27	39.1	23	44.2	.350	2
PA Recommendations (follow recommendations)	29	40.8	15	28.8	.170	1
Availability (pleased)	70	93.3	32	76.2	.008**	1
Quality (pleased)	74	98.7	29	82.9	.002**	1

**Significant at the 1%-level, PA=physical activity, df=degrees of freedom

The results from the chi-square analysis is presented in Table 2, and show that duration $\chi^2(2, N=124)=12.45, p=.002$, availability $\chi^2(1, N=117)=7.08, p=.008$ and quality $\chi^2(1, N=110)=10.01, p=.002$, all have significant associations with frequent and non-frequent users.

Table 3: Comparative analysis, independent samples t-test

	Frequent users		Non-frequent users		Mean difference	T-test 95% CI (of mean difference)
	Mean	Range	Mean	Range		
Age	71.87	67-93	72.64	67-93	.769	[-.776, 2.315]
Social Capital	29.74	7-35	26.54	7-35	3.203	[1.750, 4.657]
Social Interaction	11.85	3-15	10.93	3-15	2.00	[.708, 3.296]

CI=confidence interval

From Table 3 it is evident that both mean social capital and mean social interaction is significantly different between the groups of "frequent" and "non-frequent" users. The t-test conducted to compare social capital between frequent and non-frequent users showed that there was a significant difference in the scores for frequent (M=29.74, SD=3.496) and non-frequent (M=26.54, SD=4.710); $t(123)=4.361$, $p<.001$. The results indicate that frequent users perceive higher level of social capital compared to the non-frequent users. The t-test conducted to compare social interaction between frequent and non-frequent users showed that there was a significant difference in the scores for frequent (M=11.85, SD=1.898) and non-frequent (M=10.93, SD=2.348); $t(126)=2.456$, $p=.015$. The result suggest that frequent users experience a significant higher social interaction compared to non-frequent users.

From the chi-square analysis, there was an observation which sparked an interest, even though it did not provide a significant association. When looking at the proportions and frequencies in Table 2, it is of interest to notice that almost 60% of the frequent users are not meeting recommendations for physical activity. This is an interesting observation, and has due to the unknown implications this can have on the aim been included. the observation can be used in order to try and understand and answer the research aim, especially in relation to the significant findings.

3.3 Correlational analysis

All variables included in this thesis was entered into a partial correlational analysis at one step, and correlations with frequent and non-frequent users is presented in Table 4.

Table 4: Correlational analysis, correlations with "frequent and non-frequent users"

	Frequent and non-frequent users
	<i>Pearson correlation (r)</i>
Social Capital	.366**
Social Interaction	.214**
Availability	.246**
Quality	.302**
Age	-.085
Gender	-.133
Income	-.034
Education	-.154
Marital Status	-.067
PA Recommendations	-.124
Frequency of PA	.141
Duration of PA	.299**
Intensity of PA	.003

*Significant at the 5%-level, **Significant at the 1%-level, PA=physical activity

As seen in Table 4, social capital is seen to have the highest correlation $r(123)=.366$, $p<.000$, with quality coming in at second highest significant correlation $r(108)=.302$, $p=.001$. It is also noticeable that the only variable covering any aspect of physical activity to be significantly correlated with frequent and non-frequent users is duration $r(122)=.299$, $p=.001$. Further, both availability $r(115)=.246$, $p=.008$, and social interaction $r(126)=.214$, $p=.015$ had fairly high correlations with frequent and non-frequent users. Between other variables it was availability and quality which had the strongest significant correlation $r(174)=.751$, $p<.000$. Social capital and social interaction also had a strong significant correlation $r(223)=.637$, $p<.000$. Duration of physical activity could be seen to have a significant correlations with both frequency of physical activity $r(207)=.259$, $p<.000$, intensity of physical activity $r(199)=.236$, $p=.001$.

4 Discussion

The aim of this thesis has been comparing frequent and non-frequent users of the Malvik path, and personal-, environmental factors, and physical activity, to explore if: (i) we can identify environmental factors which contribute to use of Malvik path, and (ii) if any can explain how use of Malvik path can promote health. From the result no personal factors were associated with frequent and non-frequent users. However, frequent and non-frequent users were found to be significantly associated with perceived availability and quality; higher social capital and more social interaction; and duration of physical activity. The findings will be discussed based on relevance, and in relation to previous literature, and in the light of the occupational theory.

Results showed significant associations between frequent and non-frequent users and availability $\chi^2(1, N=117)=7.08, p=.008$, quality $\chi^2(1, N=110)=10.01, p=.002$ and duration of physical activity $\chi^2(2, N=124)=12.45, p=.002$. Frequent users had a stronger social capital than non-frequent users $t(123)=4.361, p<.001$, and frequent users had a stronger social interaction than non-frequent users $t(126)=2.456, p=.015$.

4.1 Environmental Factors Associated With Use

From the sample characteristics, it is evident that most respondents are pleased with both availability and quality of the Malvik path, as over 90% of the respondent were very pleased with these attributes. However, it is also evident that the fewest numbers of respondents can be found in the variable of "use". After having excluded participants in the middle category ($n=73$), only 134 participants could be sorted into frequent and non-frequent users. but 179 people have reported to be pleased with availability, and 175 are pleased with quality. Thus, even though the residents have a perceived opinion on the environmental factors of the path, this does not necessarily mean that they report actual use, or non-use of it. It could indicate that some people might have simply heard or read about the path, and that it is well developed, and their opinion might thus be more shaped by this, and not their own personal experiences.

When looking at the groups of frequent and non-frequent users, in association with environmental factors, results show that a significant association can be found for both availability and quality. These results can indicate that perceptions of availability and quality of the path, most likely, make people use it. The results showing that perceptions of good availability and quality is associated with frequency of use, and thus activity, somewhat correlates with previous studies [7, 17, 20, 28, 29, 35, 36, 42-45], which have found that better availability, access and quality, increase activity. Given the substantial amount of evidence of this association, and the direction the association seems to go, it is possible to assume that the results from this thesis indicate the same.

This thesis has specified the activity as use of path, and it was also interesting to see this in relation to general physical activity. Given the results showing no significant association between frequent and non-frequent users, and frequency of physical activity not intensity of physical activity, the question is raised on whether the path has actually increased the physical activity levels amongst the elderly. The result from this thesis seem to indicate that the environmental factors can promote activity in the Malvik path,

but not necessarily that being active in the Malvik path can promote general physical activity, as the results show no significant association between frequent and non-frequent use of the path and frequency of physical activity. Thus, activity in the green space do not seem to promote activity in other arenas of the residents lives.

4.2 Social Factors Associated With Use

From the results, there is an indication that social capital and social interaction is correlated with frequent and non-frequent users. The direction of this is not certain, but findings indicate that use of a path like the one in Malvik can bring opportunities for social interaction and contribute to social capital, and like this, promote health. Social aspects can be seen in theory as interrelated with person and activity [6, 8, 16, 18-25, 35, 45-47], which the result from this thesis also gives an indication of. The results show that there are significant differences between frequent users and non-frequent users of the Malvik path in both social capital and social interaction. For both aspects, the frequent users is seen to have higher scores of capital and interaction, compared to non-frequent users.

The results indicate that social aspects of environments is of importance for the elderly, and it seems that as they experience good social contact, they are also more likely to use the Malvik path. This is important, as the occupation theory [15] shows that social environments which do not facilitate participation for all, cause occupational deprivation. Thus, by ensuring opportunities for social contact in the environment is an important strategy for promoting activity.

4.3 Has the Malvik Path Promoted Physical Activity?

Based on the result, frequent and non-frequent users only had an association with duration of activity, but neither intensity nor frequency. This could indicate that those who use the path are spending more time there, but that neither intensity nor frequency of general physical activity is changed. This result can indicate that elderly people might be using the path in a more sedentary way, by using facilities such as benches for relaxation or meeting up with friends and neighbors. If this is the case, then they might not report this primary sedentary activities as physical activity, even though they might walk around in the path for some time, and have to get to and from the path. This correlates with findings in literature as well, as one study point out that longer visits to green spaces, such as parks, might not affect physical activity, but could still be positive for mental health [45].

As it seems, the path is providing opportunities to be social, which could also motivate and promote health amongst more groups in the municipality, especially those who are not normally very active. This observation can be seen in the results, as almost 60% of the frequent users are not meeting recommendations of physical activity. This could indicate that those who are not meeting the recommendations for one reason or another, is being active in the path, but might not undertake any actual physical activity. Again, the question can be raised on whether the path has actually increased the activity levels of the elderly, since we cannot be sure of how they use the path, and since the frequency of use is not showing an association with frequency of physical activity. This question regarding whether or not more green spaces actually increase activity levels has also been raised previously [37], as this study did not find any association with green spaces and actual use of it. However, as the studies investigating why elderly are not being active point out [10-14], social support and contact is an important motivation for them

to be active outside their homes, and participation in activities in the green space in the environments, even though the activities are mainly sedentary and social.

The implementation of the Malvik path has tackled some of the challenges elderly people mention when talking about their sedentary behavior and inactivity [10-14]. It is a green space which provides resting places, and green facilities, and can be a part of promoting social activities, which the elderly has highlighted as important. However, it is not likely that only the path can promote activities, but it needs to also be considered that the activities can promote use of the path, as the relationship is interrelated. The results is also supported by the occupational theory [15], as it builds on the notion that person, activity and environment is interrelated. Further, that personal experiences and environmental factors affect health outcomes. This can be seen in the results, which indicate that as people seem to be pleased with the characteristics of the green space and the social environment it provides, they also seem to use it more, increasing their activity and as such generates a positive health outcome.

The questionnaire this thesis has used data from was self-reporting, and thus there is caution that need to be made in regard to whether or not people have been honest. Given the low levels of people not meeting recommendations, it is somewhat uncertain that people have over-reported especially their physical activity levels. However, it can also be the result of people not wanting to overdo it too much, and as such report low levels of activity, when in reality they perform next to none. There are high levels of social capital and social interaction reported by the residents, and this can be an over-representation of who social they actually are, or they simply are a social neighborhood. All results from this thesis needs to be inspected with caution, because the thesis has trusted that people have been honest in their answers and there is no actual evidence for the levels of physical activity and social contact.

4.4 Method

The method chosen for this thesis can be seen as a standard for operating with the type of data presented, but it has also been subjected to a number of choices and a discussion of these is necessary. Firstly, the data sample is small. Only 291 people have reported age 67 years or older, but even so only 134 actually reported to use the Malvik path frequent or non-frequent. This means that almost half of the elderly population, has not been using the path neither frequent, nor non-frequent. For the analysis, this meant that sample sizes would remain small, and that this needed to be taken into consideration when reading and interpreting the results as small samples can affect power and effect of the results.

Second, choosing statistical analysis to be performed was a long process. There was a need to understand the data, and what type of data it was (ordinal, categorical, continuous), and further what kinds of assumptions the data needed to meet in order to actually perform the analysis. Some of the more commonly used analysis has been chosen, much due to them being robust and valid, but further because this ensures the least chance of making mistakes. All the analysis has their weaknesses, and for this thesis the biggest one was the small samples, which affect the statistical power. Third, given the small samples there was difficulties in assessing especially approximately normal distribution. Thus, the choice of using graphs was made, as statistical test is not as sensitive for small samples, and can lead to reporting wrong distributions. It was deemed better to rather use visualizations to look for normality, and to be able to actually see the distribution.

Fourth, the issue comes with the missing values. Here, the process has been somewhat radical, as missing values are excluded from analysis. By removing a large number of values, both the sample size and statistical power of the analysis will decrease. This means that when reading the results, there needs to be a caution, as the analysis was conducted on small samples and the significance will be affected by this. The biggest issue with missing values came when transforming the "use of Malvik path"-variable. By doing this, 157 cases were excluded based on missing values in the item. This meant that the sample size to be used for most of the statistical analysis, was 134. However, when looking at analysis performed on the frequent and non-frequent users (n=134) and the other items included, the number of missing values were low. Thus, most of the 134 people who provided an answer in frequent and non-frequent use, also provided answers in the other items included.

Fifth, the way activity has been reported needs to be considered. This is a self-reporting questionnaire, and as such there is room for individual interpretation and understanding of what physical activity entails. This could result in some elderly under- or over-reporting activity, and this self-reporting will most likely affect results of the analysis. Further, the large span of the answer categories made it difficult to set a cut point for the variable of "recommendations for physical activity", as it for example is impossible to know whether a person who answered "1-3 times per week" was active 1, 2 or 3 times. This meant that for the two categories of "follow" and "do not follow", there will most likely be people who belong in the other group, but this has been impossible to identify. Finally, the questionnaire distributed to residents in Malvik did not cover the environmental factor of accessibility. However, when looking at the high proportions of residents being pleased with the path, it is realistic to assume that residents would be pleased with accessibility as well. When looking through the literature, most have separated the aspects of availability and accessibility, but both have been measured in most research conducted, and both have been seen to have an association with activity. Thus, it is not expected that the missing measure of accessibility, will heavily affect the result regarding associations with environmental factors and frequent and non-frequent users of the path.

Further, an aspect is whether or not the results are strong enough to actually give an implication as to what has promoted health and what has influenced use of the Malvik path. The thesis suffers from the fact that the sample is small, and thus results need to be evaluated and analyzed with caution. This means that the thesis can give some indications, at best, but that it has not provided any hard evidence.

4.5 Limitations

The limitation for this thesis lies mainly in the small sample used, as this affects power and effect of the results. Thus, it is only possible to interpret the results as indications, but they do not say anything conclusive. As many of the analysis only provide associations, it is difficult to evaluate their direction. However, seeing the results in comparison to previous research, and theory, there is a possibility of indicating which way an association goes. However, there is a need to be careful with this, and not assume that it is the actual truth. There are some precautions that need to be taken when reading and interpreting the results. Social capital and social interaction is significantly correlated with each other, and this can be the result of answers given. We

do not know if the questionnaire has managed to measure social capital and social interaction as two separate aspects, or if the same thing has been measured twice.

4.6 Concluding Remarks

The result from this thesis need to be looked at with caution, but they do provide some indication to elderly residents in Malvik, and the Malvik path. The findings of this thesis indicate that environmental factors can be important for promoting use of the path, and that these factors in, addition to the social aspects, can indicate that by promoting use of the path, one can also promote general health amongst the residents. The thesis have built on the previous knowledge about the topic, and highlights that there is further need for research to better understand the age group and effects of green spaces in the neighborhood, especially in relation to actual use.

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