The Relation between Environmental Factors and Health Related Mobility Disability of Elderly Women with Osteoarthritis in Southern Egypt

Nadia Abdalla Mohamed

Obstetrics and Gynecology Health Nursing, Faculty of Nursing, South Valley University
drnadia37@yahoo.com

Abstract: Mobility disability in women with Osteoarthritis is due to the inactivity associated with the disease and to the effects of aging. The surrounding environment may play a key role in shaping patterns of independence and dependence among older women with mobility disability.This study was conducted to identify the prevalence of community mobility barriers and transportation facilitators and examine whether barriers and facilitators were associated with mobility disability among elderly women with Osteoarthritis.A cross-sectional analytic design was used in carrying the study whichconducting targeted women attending the orthopedic outpatient clinic at Qena, Luxor and Aswan General Hospital. Data collection started in October 2009until the end of January 2011 from a convenient sample of 600 elderly women aged 60 years and above, diagnosed with osteoarthritis for at least one year. Three tools were used: tool I is a structured interview sheet which was developed by the researcher including sociodemographic data. Tool II isthe Late-Life Function and Disability Instrument which composed of two domains of disability which were daily activity limitation and daily activity frequency. Tool III isa structured interview sheet to assess the environmental factors.The results showed a weak relationship between the age of the osteoarthritic women and the number of affected joints. There is a positive relationship betweenthe severity of disability and numbers of affected joints, the presence of uneven sidewalks and lack of near public transportation in cities more than rural.So it is recommended to modify the environment at the street level by providing safe and straight sidewalks and providing transportation suitable for osteoarthritic women with suitable seats for elderly.
[Nadia Abdalla Mohamed. **The Relation between Environmental Factors and Health Related Mobility Disability of Elderly Women with Osteoarthritis in Southern Egypt.** *J Am Sci* 2013; 9(5):408-416]. (ISSN: 1545-1003). http://www.jofamericanscience.org. 53

Key words: Osteoarthritis, Mobility disability, Environment.Disability and elderly women

Introduction

Osteoarthritis (OA), are the most common and most frequently disabling joint disorders. **(Smeltzer *et al*., 2008)** characterized by altered joint anatomy, especially the loss of articular cartilage. Pathologically OA may be defined as a condition of synovial joints characterized by focal loss of articular cartilage and simultaneous proliferation of new bone (osteophytes) with the remodeling of joint contour. **(Multani *et al.,* 2007).** It is a localized disorder with no systemic effects. **(Schoen, 2000)**

Osteoarthritis is the most prevalent and disabling of the chronic conditions affecting elderly femalesworldwide. The prevalence of osteoarthritis among women increases dramatically after the age of 50 years. Women have twice the risk than men of developing bilateral knee osteoarthritis, and 2.6 times the risk of men in developing hand osteoarthritis**. (Felson and zhang, 1998)**. A withdrawal from estrogen at menopause may be a trigger. **(Lewis *et al*., 2010 and Haq & Davatch , 2011).**

OA is listed eighth as a worldwide cause of disability especially among the elderly women. **(Lewis *et al.,* 2010)**. The precise mechanism of cartilage degradation in osteoarthritis is still unclear, but a complex interplay of genetic, environmental, metabolic and biochemical factors is proposed **(Klippel *et al*., 2010).** Age is the most consistently identified demographic risk factor for all articular sites. However, increasing age does not appear to be an absolute risk factor in the development of OA, for not every elderly woman develops OA **(Lewis *et al*., 2010)**.

The process by which aging is theorized to increase risk of OA is depicted. Some of the mechanisms and mediators demonstrated in cellular and system aging are relevant to cartilage and periarticular structures. These changes may predispose the elderly individual to altered biomechanics that increase risk of joint injury to which repair is attempted but eventually fails **(Aigner *et al*., 2007 and Malemud *et al*., 2003).**

Any joint may be affected, but the relatively lightly stressed joints of the upper limb are, in general, less prone to osteoarthritis than the highly stressed joints of the lower limb. Knee OA is more prevalent than the hip OA, but taken together they affect 10 to 25 % of those aged over 65 years in India **(Multani*et al*., 2007 and Hamblen & Hamish, 2010).**

Major areas affected are the weight- bearing joints (knees, hips, facet joint of the lumbar spine), facet joint of the cervical spine, distal interphalangeal

joints (DIP), proximal interphalangeal joints (PIP), and first metatarsophalangeal (MTP) joint. Among individual age 70 and elderly who were enrolled in the Framingham study (2003), 13 % of men and 26 % of women reported symptoms of hand osteoarthritis. Osteoarthritis rarely is found on the wrists, elbows, shoulder, ankles, or feet except after trauma. Joint involvement is unilateral in more than half of all cases **(Linton & Lach, 2007 and Landefeld *et al*., 2004)** Joint effects differ depending on the site **(Cotter & Strumpf, 2002)**

WHO (2004) estimated that the Prevalence of OA in the World was 151.4 million, The Americas 22.3 million, Africa 10.1 million, Eastern Mediterranean 6.0 million, Europe 40.2 million, South- East Asia 27.4 million, Western Pacific 45.0 million**(WHO, 2011).**

As the incidence and prevalence of osteoarthritis rise with increasing age, extended life expectancy will result in a greater number of people with the condition. In the United Kingdom (UK) 20% to 30% of elders over 60 years have symptomatic osteoarthritis and up to two million elderly people visit their general practitioner annually because of the disease **(Heikkinen *et al*.,2010).** In the United States of America (USA) almost 50% of elders in their 70s and 80s has OA **(Keysor *et al*.,(2005).**In the Middle East, More than one million people suffer from OA in Iraq**,** Yemen, Saudi Arabia, and Syria **(Halter *et al*.,2009).** In Egypt, more than five million people have OA**(Hassan,2011).**

Approximately 85% of individuals over the age of 75 years of age experience some symptoms of osteoarthritis. 40% of individuals with the disorder experience significant difficulties with daily activities to the point of interfering with work-related or social roles **(Stevermer,2005).**Regarding prevalence rate of osteoarthritis in different countries. In Sweden it was reported to be 61 % (1992), in the Netherlands 45.7 % (1992), in Europe and America 30 % (2003), in Australia 20 % (1998), in in UK 12 % (2003), and in Saudi Arabia it affects 11.3 % of elderly female (1990) **(March & Bagga, 2004;Armour & Cairns, 2002;Bagge *et al*.,1992, Tallis & Fillit, 2003 andAhlbeg *et al*.,1990).**

According to the WHO, disability is an umbrella term for impairment, activity limitation, participation restrictions, and environmental factors. A woman's functioning or disability is viewed as a dynamic interaction between health conditions (i.e., diseases, disorders, injuries, trauma) and contextual factors (i.e., personal and environmental factors). Disability is not an "all or nothing" concept. There is a wide range of functional limitations **(Smeltzer *et al.*, (2008)**.

The physical environment can be critical to effective functioning, particularly for the disabled elderly women. It includes community environment, home environment, communication devices, transportation factors, basic mobility and assistive devices. **(Whiteneck and Dijkers, 2009).**

Community environment means the characteristics of the elderly women community environment at the street level (uneven sidewalks). As a result of declining health and functional status, financial strain and social isolation, the elderly women are vulnerable to conditions in the built environment. Uneven or discontinuous sidewalks are just some of the built environment characteristics that can create barriers for outdoor mobility, which can have spillover effects on elderly women' ability to function independently in the community. **(Clarke *et al*., 2009 and Hand 2011).**

According to "CDC Department of Health, Accessibility and the Environment"; poorly designed communities can make it difficult for elderly women with mobility impairments or other disabling conditions to move about in their environment. **(CDC, Department of Environmental Health. Accessibility and the environment. 2012).**

Availability of public transportation is a critical link in the ability of the elderly women to remain independent and functional. The lack of accessible transportation may contribute to other problems such as social withdrawal, poor nutrition, or neglect of health care. A crisis in mobility exists for many elderly women because of the lack of an automobile, an inability to drive, limited access to public transportation, health factors, geographical location, or economic consideration. Rural residence may experience more difficulty than urban residents. **(Howie *et al*.,2012)**

The study area includes; Aswan, Luxor, and Qena governorate located in southern Egypt). Egypt is geographically divided into Upper (south) and Lower (north) Egypt, according to the flow of the River Nile, which drains from South and heading northward. So, the Southern part of Egypt is called Upper Egypt.

Egypt is located in the northeastern corner of the African continent and a part of the Middle East,bounded by the Mediterranean Sea, Red Sea, Libya, and Sudan from north, east, west and south, respectively(Fig, 1).It covers approximately 1,001,450sq. Km.), Egypt, which is the formal used name but Misr is the Arabic name used by the people of the country. It is derived from the Greek 'Aegyptos', which probably comes from ancient Egyptian words referring to the land **(Wikipedia).** According to Walter (1996) the Egyptian population is quite homogeneous. In addition, Islam is practiced by the majority of the Egyptian population (90%) and it rules their personal, economic, political, and legal lives. In Egypt, men and women have equal legal

rights. However equality is not determined only by law, culture plays a role. **Walter (1996).**

One of the worst things about OA is its negative effect on quality of life. This may lead to loss of self-esteem, depression and deterioration of personal relationships and professional careers.Also, reducing the functional capacity of a women and results in disability **(Multani et al., 2007).**Incapability in performing everyday activities independently and resultant loss of personal autonomy are undesirable consequences of functional impairment at the individual level. At the population level impaired functioning is associated with increased mortality and use of health services**. (Aijanseppa *et al.*,(2005) and Boonen &Maksymowych,2010).**

Question research

What are the environmental factors that are associated with health related mobility disability of elderly women with osteoarthritis?

What is the relation between environmental factors and health related mobility disability of elderly women with osteoarthritis?

The objectives of this study were to (a) Identify the prevalence of community mobility barriers and transportation facilitators and (b) examine whether barriers and facilitators were associated with disability among elderly women with mobility disability.

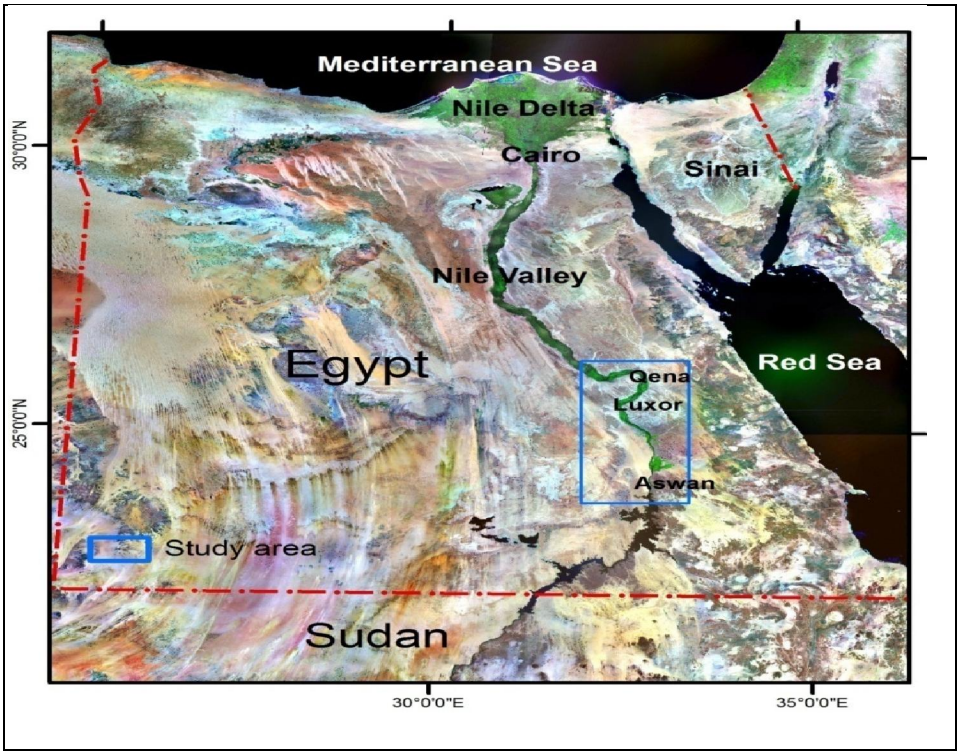

Figure 1. Landsat ETM+ mosaic of Egypt showing the study area that marked by the blue polygon in south Egypt including; Qena, Aswan and Luxor governors.

2. Materials and method

Research design:

The study followed the cross sectional design.

Settings:

The study was carried out at the orthopedic Outpatient Clinics of Qena, Luxorand Aswan General Hospital.

Study area located in southern Egypt included Qena, Luxor and Aswan along the Nile bank pounded from East by Red sea and western desert, Libya, from North and the Mediterranean Sea and from South, Nasser Lake. The area is very hot in summer (temperature = 40 ^{0} c) and very cold in the winter (temperature = 24 ^{0} c). Generally the area is arid legion with rarely rainfall except sun shower from time to time. Mainly composed of rock, hills and elevations.

Sample Size:

The study included 600 elderly women (Qena , Luxor and Aswan)

Study sample:

Inclusion criteria included:

Aconvenient sample of 600 elderly women aged 60 years and above, diagnosed with osteoarthritis for at least one year and reported of "any difficulty" on at least two of the following three items on the Western Ontario and McMaster Osteoarthritis Index (WOMAC) **(Keysor et al 2010).**

(1) Going upstairs.
(2) Rising from sitting.
(3) Bending or squatting to the floor.

Exclusion criteria included:

Women with diseases causing disability such as (heart disease, diabetes mellitus, and rheumatoid arthritis).

Tools of data collection:

Three tools were used

The tool I:

A structured interview sheet was developed by the researcher to collect the relevant data which include sociodemographic data such as the age of women, educational level and site of osteoarthritis.

Tale II:

The Late-Life Function and Disability Instrument (LLFDI) was developed by **Jette *et al*., (2004)**.It's composed of two domains of disability, (a) daily activity limitation (DAL) and (b) daily activity frequency (DAF).All items on the LLFDI were scored on a 5-point Likert-like scale: None (have no difficulty doing the activity**),** A little (can do it alone with a bit of difficulty), Some(can do it, but have a moderate amount of difficulty doing it alone) , Quite a lot (can manage without help, but have quite a lot of difficulty doing it)and Cannot do (It is so difficult that cannot do it unless have help)scored 5, 4, 3, 2 and 1 respectively.

Tool III:

A structured interview sheet to **assess**the environmental factors including Presence of community barriers (uneven sidewalks or other walking areas) and facilitators (Public transportation that is close to women's home)) was ascertained by the Home and Community Environment survey which was developed by **Keysor *et al*., 2005.**Based on the relevant literature the researcher found that these two items are the most affected and more common. The response was scored as 0fordon't know, 1for not at all**,** 2forsome and 3fora lot.

The tools were face and content validated through the opinions of five experts in Obstetrics &Gynecology and community health both nursing and medicine. The panel reviewed the tools for comprehensiveness, relevance, and clarity. The tools were modified according to the panels' recommendations. As for the reliability, The Late-Life Function and Disability Instrument' internal consistency and the Home and Community Environment were measured. They proved to be of good reliability with Cronbach alpha coefficients 0.85 and 0.78, respectively.

Field work:

The study started at the October2009until the end of January 2011.The numbers of osteoarthritic elderly women who visit the outpatient clinics increase in the winter of each year. Data collection was done during the morning hours, 9:00 A.M to 1: P.M. Each interview took about 10 to 25 minutes. They took about three years. The researcher introduced herself to the eligible women and briefly explained the nature of the study.

Administrative approval:

The necessary official permission was obtained from the top manager of each general hospital to proceed with the study

A Pilot study was conducted in60 of the sample, who was excluded from the study, to assess the clarity of the tools and estimate the time required for filling the sheet.

Ethical consideration:

A formal consent was obtained orally from women before being involved in the study. The nature and purpose of the study were explained. The researchers informed the women that there is no risk or cost for participation, and the participation is voluntary. Also, the women were assured that the confidentiality of information will be done and anonymity of each subject was maintained.

Spatial analysis

The collected data were statistically analyzed using spreadsheet (Excel). The average of the response was computed by excel sheet.

The variables as disabling frequency, disability limitation, the presence of public transportation and presence of uneven sidewalks were analyzed and integrated using Geographical Information system (GIS) software packages.

In order to understand the spatial distribution of the osteoarthritis disability in Qena, Aswan and Luxor Governorates, the data were processed using Geographic Information Systems (GIS) software packages e.g., Arc GIS 9.3.1. Different thematic maps e.g., sites of osteoarthritis "1 (knee), 2 (Hip), 3 (lumbar), 4 (cervical)", average of disabling frequency (AVGDF), average of disability limitation (AVGDL), uneven sidewalks (community barriers) (COM), near public transportation (TRANS), education (EDU), and ages were prepared using interpolated methods e.g., Inverse Distance Weighting (IDW) method as a function of Arc GIS tools. Each map has been classified into four classes and ranked by a numeric scale (1 to 4 where 4 is the highest value and 1 is the lowest. All maps were integrated in the Arc GIS using the Raster Calculator as a function of the Spatial Analyst tools **(e.g., Eastman *et al*., 1995; Eastman 1996; Vooged 1983 and Abdelkareem *et al*., 2012)** as given below:

Site of osteoarthritis potential map1 = Site 1+ Site 2+ Site 3+ Site 4

Disability and environmental factors potential map2 = AVGDF+ AVGDL+ COM+ TRANS

Each final map formed by the above equation was divided into five categories ranked by a numeric scale (1 to 5 where 5 is the highest value and 1 is the lowest).

3. Results

Results of interpreting the spatial distributions and GIS analysis are given below in reference to the distribution of osteoarthritis in three governorates in Egypt.

Site one: the spatial distribution of Knee osteoarthritis is most common in Dishna, Nagaa Hammadi, Qus, Luxor, Edfu, and Aswan (Fig. 2a).

Site two: the spatial distributionof Hip osteoarthritis is most common in NagaaHammadi, Qus,Qift, Esna, and KomOmbo (Fig. 2b).

Site three: the spatial distribution of Lumbar osteoarthritis is more common in Abu Tesht, Qus,Qift, Edfu, Esna and Komombo (Fig. 2c).

Site four: the spatial distribution cervical osteoarthritis is less distributed in the study area; however cities e.g., NagaaHammadi, Qus, Edfu, and Kom Ombo record higher density (Fig. 2d).

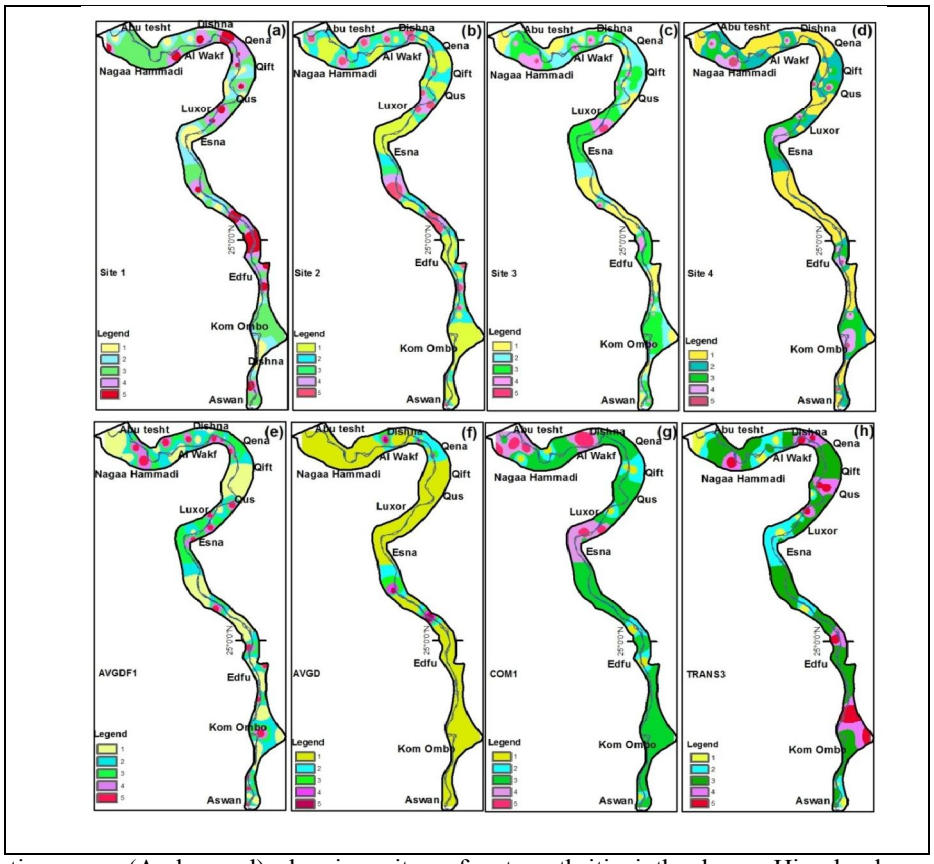

Figure 2. Thematic maps. (A, b, c, d) showing sites of osteoarthritis inthe knee, Hip, lumber, and cervical, respectively. (e) Average of disabling frequency (AVGDF); (f) average of disability limitation (AVGDL), (g) uneven sidewalks (COM); (h) near public transportation (TRANS).

Disability frequency distribution (AVGDF1) in the study area showed moderately positive relationships with other osteoarthritis sites. The higher level is most common in NagaaHammadi, Al Wakf, Qena, Qus, Luxor, Esna and Komombo. It decreases in Aswan(Fig. 2e).

Disability limitation (AVGD) is less distributed through the study area and most of the investigated sites showing low density but some cities e.g., Dishnaand areas between Esna and Edfu record high density(Fig. 2f).

Uneven sidewalks: most of the investigated area showed low uneven sidewalks but Abu tesht, Dishna and Esna record higher values. This revealed the high topography areas with low road quality (Fig. 2g).

Transportation: Near public transportation is most common in Dishna, NagaaHammadi, Qus, Luxor and Komombo(Fig. 2h).

DF, DL, uneven sidewalks and public transportation are most common in NagaaHammadi, Dishna, Qena and Luxor. Elderly people are few and have OA in four joints. Finally disability is more common in NagaaHammadi, Dishna, Qena and Luxor.

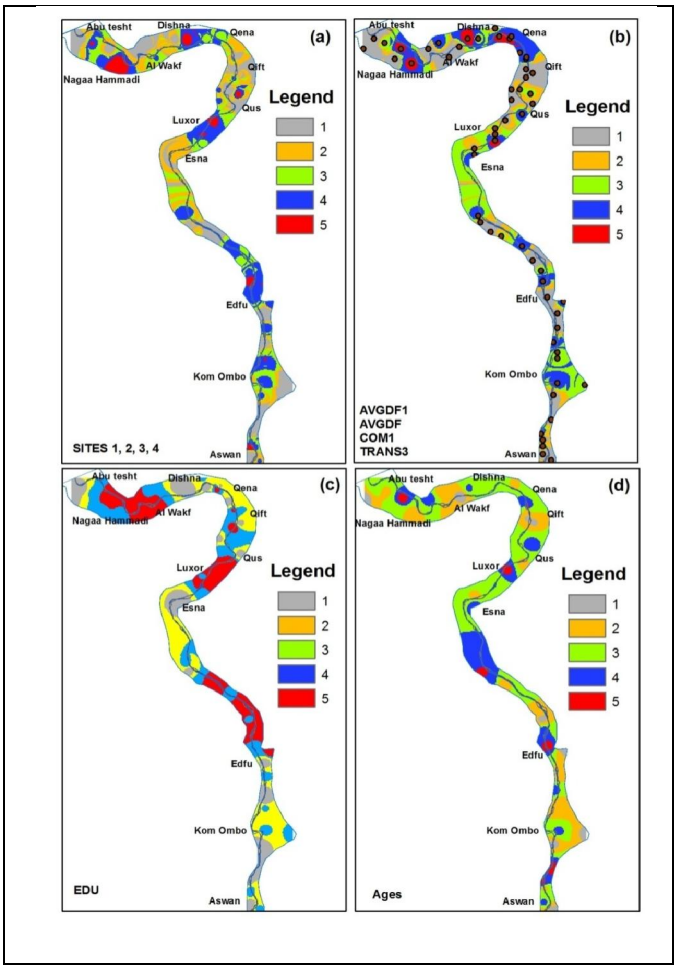

Figure 3. Integrated maps. (a) Osteoarthritis density map integrated including knee, Hip, lumber, and cervical sites; (b) Integrated map of average of disability frequency (AVGDF), average of disability limitation (AVGDL), uneven sidewalks (COM), near public transportation (TRANS); (c) Distribution of the education levels in the study area; (d) Distribution of the age in the study area.

There is a weak relationship between the age of the osteoarthritic women and the number of joints affected by osteoarthritis. This is observed in Dishna and Luxor while in Aswan and Edfu there is a relation between age and number of affected joints.It was observed that there is a relation between age and disability

Despite the increase number of young older women (60-69 years) in north of us, NagaaHammadi and Dishna, those women have more affected joints.

These results reflect that there is a strong relation between the numbers of affected joints and disability. In NagaaHammadi, Dishna, Qena, Qus and Luxor.The severity of disability increase with the increasing presence of uneven sidewalks (COM1) and lack of public transportation (TRANS).

Also, there isn't a significant relation between education level, number of affected joints and disability.

Discussion

Based on data integration and correlation, thereisa weak relationship between the age of the osteoarthritis women and the number of joints affected by osteoarthritis (Fig 3, map a & d) due to there isn't an apparent difference between categories of age (60 to 75 years). This is observed in Dishna and Luxor while in Aswan and Edfu. There is a relation between age and number of affected joints because the study sample from Aswan aged 85 years and also 60 years. This means that apparent difference between categories of age. It was observed that there is a

relation between age and disability (Fig 3, map b & d) due to higher floors, low economic status, overload tasks, heavy activities and high parity. Despite the increase number of young older women (60-69 years) in north of us, NagaaHammadi and Dishna, those women have more affected joints(Fig 3, map a & d).These results reflect that there is a strong relation between the numbers of affected joints and disability (Fig 3, map a & b). The increasing numbers of affected joints, increasing the severity of disability in cities more than rural in NagaaHammadi, Luxor, Dishna and Qus.This finding is in disagreement with the studies done by **Clarke *et al*., (2005)**and **(2009)** in the USAwhich suggest that older women living in urban settings are less likely to be disabled. Also other studies done by **Joshi *et al*., (2003) and Medhi *et al*., (2006)** in India reported rural-urban differences in the prevalence of mobility disability.

Maintaining mobility independence of older women with OA who are at the greatest risk for functional decline and disability in the environment is an important goal of obstetric nursing. Older women who lose independent mobility are less likely to remain in the community. They have higher rates of morbidity, mortality, self-care disability and experience a poorer quality of life. **(Gill *et al*., 2012)**

In NagaaHammadi, Dishna, Qena, Qus and Luxor the severity of disability increase with the increasing presence of uneven sidewalks and lack of near public transportation (Fig 3, map b).

Concerningpresence of uneven sidewalks, the previous finding goes harmony with other studies done by **Keysor *et al*.,(2008) and Meyers *et al*.,(2002**)which found that people who reported a greater presence of community mobility barriers were likely to report more mobilitydisability. While other studies done by **Haak *et al*., (2008)** in USA and **Oswald *et al*., (2007)** in Germany who used the same environmental assessment scale stated that a number of environmental barriers was not associated with mobility disability among elders.

In relation to public transportation, the previous finding is in the same direction with the study done by **Keysor et al (2010)** in the USA who found that, people reporting fewer transportation opportunities in their community perceived more limitation in their daily activities. The same findings were reported by most cross-sectional studies done by **Talbot *et al.*, (2004)** in Canada **and Fuzhong *et al*., (2008)** in the USAthat, public transportation was associated with going outside the home and physical activity in older adults.

Also, there isn't an apparent relation between education level, number of affected joints and disability(Fig 3, map a & c). Each one of the study variables can affect the others.

Conclusion

From previous results, it can be concluded that in cities such as NagaaHammadi, Dishna, Qena, Qus and Luxor.The severity of disability increase with the increasing presence of uneven sidewalks and lack of public transportation.

Recommendation:

Organize with local units of each city to modify environment at the street level by providing safe and straight sidewalks.

Providing transportation suitable forosteoarthritiswomen with suitable seats for elderly or other kinds of help to enable olderwomen to participate in social activities.

Corresponding author
Nadia Abdalla Mohamed
Obstetrics & Gynecological Health Nursing, Faculty of Nursing, South Valley University
drnadia37@yahoo.com

References

1. Abdelkareem M.; F. El-Baz, M. Askalany, A. Akawy and E. Ghoneim (2012). Groundwater Prospect Map of Egypt's Qena Valley uses Data Fusion. International journal of images and data fusion, 3 : 169-189.
2. Ahlbeg A.; B. Linder and T.A. Binhemd(1990). Osteoarthritis of the hip and knee in Saudi Arabia. Int Orthop,14: 29- 30.
3. Aigner T, Haag1 J, Martin J, Buckwalter J. Osteoarthritis (2007). Aging of Matrix and Cells - Going for a Remedy. Current Drug Targets, 8: 325-31.
4. Aijanseppa S, Notkola I, Tijhuis M, Staveren W, Kromhout D, Nissinen A. Physical functioning in elderly Europeans (2005). 10 year changes in the north and south: the HALE project. J Epidemiol Community Health,59:413–419.
5. Armour D, Cairns C. (2002). Medicines in the elderly. London: Pharmaceutical press Co., 300-9.
6. Bagge E, Bjelle A, Valkenburg HA, Svanborg (1992). Prevalence of radiographic osteoarthritis in two elderly populations. Rheumatol in, 12: 33-8.
7. Boonen A, Maksymowych W. (2010). Measurement: function and mobility (focusing on the ICF framework). Best Practice & Research Clinical Rheumatology, 24: 605–624.
8. CDC, Department of Environmental Health. Accessibility and the environment.Available at http://www.cdc.gov/healthyplaces/healthtopics/accessibility.htm.Retrieved on 3/2/2012.
9. Clarke Ph, Ailshire J, Lantz P. (2009). Urban built environments and trajectories of mobility

disability: Findings from a national sample of community- dwelling American adults (1986–2001). Social Science & Medicine,69: 964–70.
10. Clarke Ph, George L. (2005). The Role of the Built Environment in the Disablement Process. American Journal of Public Health, 95 : 1933–39.
11. Cotter V, Strumpf N. (2002). Advanced practice nursing with elderly adults: clinical guidelines.New York: The McGraw- Hill companies, 238- 42.
12. Eastman, J.R. (1996). Multi-criteria evaluation and GIS. In: P.A. Longley, et al., eds. Geographical information systems. 2nd ed., Vol. 1, New York: John Wiley and Sons, 493–502.
13. Eastman, J.R. (1995). Raster procedure for multi-criteria/multi-objective decisions. Photogrammetric Engineering and Remote Sensing,.61, 539–547.
14. Felson DT, Zhang Y. (1998). An update on the epidemiology of knee and hip osteoarthritis with a view to prevention. Arthritis Rheu, 41 : 1343-1355
15. Fuzhong Li, Harmer P, Cardinal B, Bosworth M, Acock A, Johnson-Shelton D, Moore J. (2008). Built Environment, Adiposity, and Physical Activity in Adults Aged 50–75. Am J Prev Med., 35: 38–46.
16. Gill Th, Gahbauer E, Murphy T, Han L, Allore H. (2012). Risk Factors and Precipitants of Long-Term Disability in Community Mobility. Annals of Internal Medicine journal,156: 131- 40.
17. Haak M, Fänge A, Horstmann V, Iwarsson S. (2008). Two dimensions of participation in very old age and their relations to home and neighborhood environments. American Journal of Occupational Therapy; 62 : 77-86.
18. Halter J, Ouslander J, Tinetti M, Studenski S, High K, Asthana S. (2009). Hazzard' Geriatric Medicine and Gerontology. 6thed. New York:The McGraw-Hill companies, 1411-19.
19. Hamblen D, Hamish A. (2010). Adams's outline of Orthopaedics.14th ed. China: Elsevier company, 140-43.
20. Hand C. (2011). Neighbourhood and Social Influences on Participation in Everyday Activities Among Elderly Adults with Chronic Health Conditions. Published thesis, DSN, Hamilton, Ontario: McMaster University, School of Graduate Studies, Available athttp://www.proquest.com.
21. Haq S, Davatch F. (2011). Osteoarthritis of the knees in the COPCORD world. International Journal of Rheumatic Diseases, 14: 122–129.
22. Hassan, B. (2011). Comparative clinical study of non-pharmacologic interventions for relieving moderate to severe knee pain in elderly patients. Unpublished thesis, DSN, Alexandria: University of Alexandria , Faculty of Nursing,.
23. Heikkinen E, Ebrahim S, FerrucciL,Guralnik J, Rantanen T, Marianne S. (2004). Disability in Old Age (Final Report). University of Jyväskylä. Availablehttp://www.jyu.fi/BURDIS/.Retrieved on 25/11/2010.
24. Heikkinen E. (2003). What are the main risk factors for disability in old age and how can disability be prevented? (Health Evidence Network report). Copenhagen, WHO. Available at http://www.euro.who.int/document/E82970.pdf.
25. Howie E, Barnes T, McDermott S, Mann J, Clarkson J, Meriwether R. (2012). Availability of physical activity resources in the environment for adults with intellectual disabilities. Disability and Health Journal, 5: 41-48.
26. Joshi K, Kumar R, Avasthi A. (2003). Morbidity profile and its relationship with disability and psychological distress among elderly people in Northern India. Int J Epidemiol,32 : 978-87.
27. Keysor J, Jette A, LaValley M, Lewis C, Torner J, Nevitt M, Felso D. (2010). Community Environmental Factors Are Associated With Disability in Older Adults With Functional Limitations: The MOST Study. Journal of Gerontology: Medical Sciences,65 : 393– 99.
28. Keysor J, Jette A, Haley S. (2005). Development of the Home And Community Environment Instrument. American journal of Rehabilitation, 37: 37- 44.
29. Keysor J. (2008). Home and Community Environment (HACE) Survey: Instrument and Scoring Manual. Department of Physical Therapy and Athletic Training, Boston University,. Available at http://www.bu.edu.
30. Klippel J, Giles W. A. (2010). National Public Health Agenda for Osteoarthritis. Center for Disease control and Prevention & Arthritis Foundation,;1-62.Availableat www.cdc.gov/arthritis/docs/OAagenda.pdf . Retrieved on 12/1/2012.
31. Landefeld C, Palmer R, Johnson M, Johnston C, Lyons W. (2004). Current Geriatric diagnosis &treatment.New York: The McGraw- Hill companies,; 257-59.
32. Lewis SH, Heitkemper M, Dirksen SH. (2010).Orthopedic examination, evaluation and intervention. 2nd ed. Philadelphia: Mosby company, 1745- 49.
33. Linton A, Lach H. (2007). Gerontological nursing.3rd ed. Philadelphia: Elsevier company, 272-77.
34. Malemud CH, Islam N, Haqqi T. (2003). Pathophysiological Mechanisms in Osteoarthritis Lead to Novel Therapeutic Strategies. Cells Tissues Organs,174: 34–48.

35. March L, Bagga H. (2004).Epidemiology of osteoarthritis in Australia. MJA, 180 : 6-10.
36. Medhi GK, Hazarika NC, Borah PK, Mahanta J. (2006). Health problems and disability of elderly individuals in two population groups from same geographical location. J Assoc Physicians India, 54 : 539-44.
37. Meyers AR, Anderson JJ, Miller DR, Shipp K, Hoenig H. (2002). Barriers, facilitators and access for wheelchair users: substantive and method-ologic lessons from a pilot study of environmental effects. Soc Sci Med.,55:1435–1446.
38. Multani N, Ouslander J, Verma S. (2007). Principles of geriatric physiotherapy. New Delhi: Jaypeebrotherscompany, 92-97.
39. Oswald F, Wahl HW, Schilling O, Nygren C, Fänge A, Sixsmith A, Sixsmith J, Széman Z, Tomsone S, Iwarsson S. (2007). Relationships between housing and healthy aging in very old age. Gerontologist, 47 : 96-107.
40. Schoen D. (2000). Adult Orthopaedic Nursing. Philadelphia: Lippincott Williams & Wilkins company, 43-60.
41. Smeltzer S, Bare B, Hinkle J, (2008). Cheever. Brunner &Suddarth's Textbook of Medical-Surgical Nursing.11th ed. Philadelphia: Lippincott Williams & Wilkins company, 1914-16, 174-85.
42. Stevermer C. (2005). Functional movement assessment for individuals with knee osteoarthritis. Published thesis, DSN, Iowa: Iowa State University, Faculty of the Graduate,. Available at http://www.proquest.com.
43. Talbot L, ViscogliosiCh, Desrosiers J, Vincent C, Rousseau J, Robichaud L. (2004). Identification of rehabilitation needs after a stroke: an exploratory study. Health Qual Life Outcomes; 2: 53. Available at http://www.biomedcentral.com.
44. Tallis R, Fillit H. (2003). Geriatric medicine and gerontology. 6th ed. Londone: Churchill Livingstone Co., 896-98.
45. Vooged, H., (1983). Multi-criteria evaluation for Urban and Regional Planning. London: Pion.
46. Walter, A. (1996). Mass culture and Modernism in Egypt. Cambridge: University of Cambridge Press.
47. Whiteneck G, Dijkers, M. P. (2009). Difficult to measure constructs: conceptual and methodological issues concerning participation and environmental factors. Archives of Physical Medicine and Rehabilitation; 90: 22 – 35.
48. WHO. Disease incidences, Prevalence and disability. Available at http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_part3.pdf.Retrieved on 23/12/2011.

3/12/2013